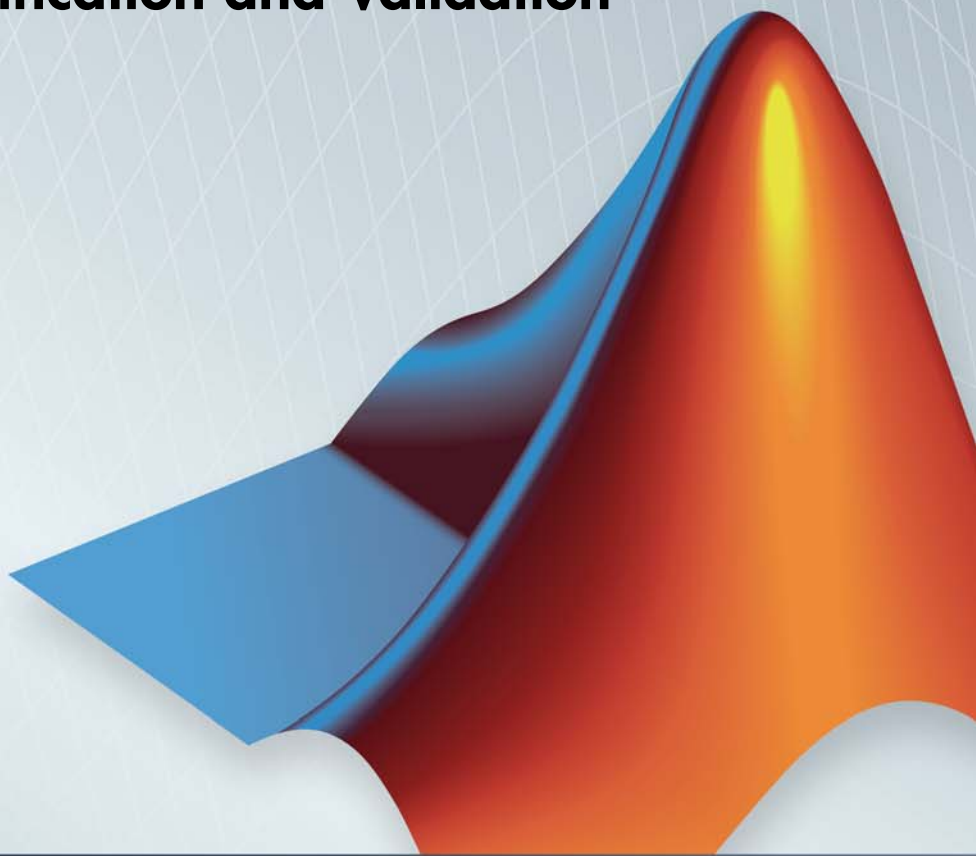


# Simulink<sup>®</sup> Verification and Validation<sup>™</sup> Reference

R2014a



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## Functions — Alphabetical List

1

## Block Reference

2

## Model Advisor Checks

3

<b>Simulink Verification and Validation Checks</b> .....	3-2
Simulink Verification and Validation Checks Overview ..	3-2
Modeling Standards Checks Overview .....	3-3
Modeling Standards for MAAB Overview .....	3-3
Naming Conventions Overview .....	3-4
Model Architecture Overview .....	3-4
Model Configuration Options Overview .....	3-5
Simulink Overview .....	3-5
Stateflow Overview .....	3-5
MATLAB Functions Overview .....	3-6
<b>DO-178C/DO-331 Checks</b> .....	3-7
DO-178C/DO-331 Checks Overview .....	3-8
Check safety-related optimization settings .....	3-10
Check safety-related diagnostic settings for solvers .....	3-14
Check safety-related diagnostic settings for sample time ..	3-17
Check safety-related diagnostic settings for signal data ..	3-20
Check safety-related diagnostic settings for parameters ..	3-23
Check safety-related diagnostic settings for data used for debugging .....	3-26
Check safety-related diagnostic settings for data store memory .....	3-28

Check safety-related diagnostic settings for type conversions .....	3-30
Check safety-related diagnostic settings for signal connectivity .....	3-32
Check safety-related diagnostic settings for bus connectivity .....	3-34
Check safety-related diagnostic settings that apply to function-call connectivity .....	3-36
Check safety-related diagnostic settings for compatibility .....	3-38
Check safety-related diagnostic settings for model initialization .....	3-40
Check safety-related diagnostic settings for model referencing .....	3-43
Check safety-related model referencing settings .....	3-46
Check safety-related code generation settings .....	3-48
Check safety-related diagnostic settings for saving .....	3-55
Check for blocks that do not link to requirements .....	3-57
Check usage of Math blocks .....	3-58
Check state machine type of Stateflow charts .....	3-60
Check Stateflow charts for ordering of states and transitions .....	3-62
Check Stateflow debugging options .....	3-64
Check usage of lookup table blocks .....	3-66
Check MATLAB Code Analyzer messages .....	3-68
Check MATLAB code for global variables .....	3-70
Check for inconsistent vector indexing methods .....	3-71
Check for MATLAB Function block interfaces with inherited properties .....	3-72
Check MATLAB Function block metrics .....	3-74
Check for blocks not recommended for C/C++ production code deployment .....	3-76
Check Stateflow charts for uniquely defined data objects ..	3-77
Check usage of Math Operations blocks .....	3-78
Check usage of Signal Routing blocks .....	3-81
Check usage of Logic and Bit Operations blocks .....	3-82
Check usage of Ports and Subsystems blocks .....	3-84
Display model version information .....	3-87
<b>IEC 61508, ISO 26262, and EN 50128 Checks .....</b>	<b>3-88</b>
IEC 61508, ISO 26262, and EN 50128 Checks Overview ..	3-89
Display model metrics and complexity report .....	3-90
Check for unconnected objects .....	3-92
Check for root Inports with missing properties .....	3-93

Check for MATLAB Function block interfaces with inherited properties .....	3-95
Check MATLAB Function block metrics .....	3-97
Check for root Inports with missing range definitions ....	3-99
Check for root Outports with missing range definitions ...	3-101
Check for blocks not recommended for C/C++ production code deployment .....	3-103
Check usage of Stateflow constructs .....	3-104
Check state machine type of Stateflow charts .....	3-109
Check for model objects that do not link to requirements ..	3-111
Check for inconsistent vector indexing methods .....	3-113
Check MATLAB Code Analyzer messages .....	3-114
Check MATLAB code for global variables .....	3-116
Check usage of Math Operations blocks .....	3-117
Check usage of Signal Routing blocks .....	3-119
Check usage of Logic and Bit Operations blocks .....	3-120
Check usage of Ports and Subsystems blocks .....	3-122
Display configuration management data .....	3-125
<b>MathWorks Automotive Advisory Board Checks .....</b>	<b>3-126</b>
MathWorks Automotive Advisory Board Checks	
Overview .....	3-128
Check font formatting .....	3-129
Check Transition orientations in flowcharts .....	3-131
Check for nondefault block attributes .....	3-132
Check signal line labels .....	3-133
Check for propagated signal labels .....	3-135
Check default transition placement in Stateflow charts ..	3-136
Check return value assignments of graphical functions in Stateflow charts .....	3-137
Check entry formatting in State blocks in Stateflow charts .....	3-138
Check usage of return values from a graphical function in Stateflow charts .....	3-139
Check for pointers in Stateflow charts .....	3-140
Check for event broadcasts in Stateflow charts .....	3-141
Check transition actions in Stateflow charts .....	3-142
Check for MATLAB expressions in Stateflow charts ....	3-143
Check for indexing in blocks .....	3-144
Check file names .....	3-146
Check folder names .....	3-147
Check for prohibited blocks in discrete controllers .....	3-148
Check for prohibited sink blocks .....	3-149
Check positioning and configuration of ports .....	3-150

Check for matching port and signal names .....	3-152
Check whether block names appear below blocks .....	3-153
Check for mixing basic blocks and subsystems .....	3-154
Check for unconnected ports and signal lines .....	3-155
Check position of Trigger and Enable blocks .....	3-156
Check usage of tunable parameters in blocks .....	3-157
Check Stateflow data objects with local scope .....	3-158
Check for Strong Data Typing with Simulink I/O .....	3-159
Check usage of exclusive and default states in state machines .....	3-160
Check Implement logic signals as Boolean data (vs. double) .....	3-162
Check model diagnostic parameters .....	3-163
Check the display attributes of block names .....	3-166
Check display for port blocks .....	3-167
Check subsystem names .....	3-168
Check port block names .....	3-170
Check character usage in signal labels .....	3-171
Check character usage in block names .....	3-173
Check Trigger and Enable block names .....	3-175
Check for Simulink diagrams using nonstandard display attributes .....	3-176
Check MATLAB code for global variables .....	3-178
Check visibility of block port names .....	3-179
Check orientation of Subsystem blocks .....	3-181
Check usage of Relational Operator blocks .....	3-182
Check usage of Switch blocks .....	3-183
Check usage of buses and Mux blocks .....	3-184
Check for bitwise operations in Stateflow charts .....	3-185
Check for comparison operations in Stateflow charts .....	3-187
Check for unary minus operations on unsigned integers in Stateflow charts .....	3-188
Check for equality operations between floating-point expressions in Stateflow charts .....	3-189
Check input and output settings of MATLAB Function blocks .....	3-190
Check MATLAB Function block metrics .....	3-192
Check for mismatches between names of Stateflow ports and associated signals .....	3-194
Check scope of From and Goto blocks .....	3-195
<b>Requirements Consistency Checks .....</b>	<b>3-196</b>
Identify requirement links with missing documents .....	3-197



Identify requirement links that specify invalid locations within documents .....	<b>3-198</b>
Identify selection-based links having descriptions that do not match their requirements document text .....	<b>3-199</b>
Identify requirement links with path type inconsistent with preferences .....	<b>3-201</b>



# Functions — Alphabetical List

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# Advisor.authoring.CustomCheck.actionCallback

---

**Purpose** Register action callback for model configuration check

**Syntax** `Advisor.authoring.CustomCheck.actionCallback(task)`

**Description** `Advisor.authoring.CustomCheck.actionCallback(task)` is used as the action callback function when registering custom checks that use an XML data file to specify check behavior.

**Examples** This `sl_customization.m` file registers the action callback for configuration parameter checks with fix actions.

```
function defineModelAdvisorChecks

    rec = ModelAdvisor.Check('com.mathworks.Check1');
    rec.Title = 'Test: Check1';
    rec.setCallbackFcn(@(system)(Advisor.authoring.CustomCheck.checkCallback(system)),
        'None', 'StyleOne');
    rec.TitleTips = 'Example check for check authoring infrastructure.';

    % --- data file input parameters
    rec.setInputParametersLayoutGrid([1 1]);
    inputParam1 = ModelAdvisor.InputParameter;
    inputParam1.Name = 'Data File';
    inputParam1.Value = 'Check1.xml';
    inputParam1.Type = 'String';
    inputParam1.Description = 'Name or full path of XML data file.';
    inputParam1.setRowSpan([1 1]);
    inputParam1.setColSpan([1 1]);
    rec.setInputParameters({inputParam1});

    % -- set fix operation
    act = ModelAdvisor.Action;
    act.setCallbackFcn(@(task)(Advisor.authoring.CustomCheck.actionCallback(task)));
    act.Name = 'Modify Settings';
    act.Description = 'Modify model configuration settings.';
    rec.setAction(act);
```

# Advisor.authoring.CustomCheck.actionCallback

---

```
mdladvRoot = ModelAdvisor.Root;  
mdladvRoot.register(rec);  
end
```

## See Also

Advisor.authoring.DataFile |  
Advisor.authoring.CustomCheck.checkCallback |  
Advisor.authoring.generateConfigurationParameterDataFile

## How To

- “Create Check for Model Configuration Parameters”

# ModelAdvisor.FactoryGroup.addCheck

---

**Purpose** Add check to folder

**Syntax** `addCheck(fg_obj, check_ID)`

**Description** `addCheck(fg_obj, check_ID)` adds checks, identified by `check_ID`, to the folder specified by `fg_obj`, which is an instantiation of the `ModelAdvisor.FactoryGroup` class.

**Examples** Add three checks to rec:

```
% --- sample factory group
rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');
.
.
.
addCheck(rec, 'com.mathworks.sample.Check1');
addCheck(rec, 'com.mathworks.sample.Check2');
addCheck(rec, 'com.mathworks.sample.Check3');
```

**Purpose** Add subfolder to folder

**Syntax** `addGroup(group_obj, child_obj)`

**Description** `addGroup(group_obj, child_obj)` adds a new subfolder, identified by `child_obj`, to the folder specified by `group_obj`, which is an instantiation of the `ModelAdvisor.Group` class.

**Examples** Add three checks to rec:

```
group_obj = ModelAdvisor.Group('com.mathworks.sample.group');  
.  
.  
.  
addGroup(group_obj, 'com.mathworks.sample.subgroup1');  
addGroup(group_obj, 'com.mathworks.sample.subgroup2');  
addGroup(group_obj, 'com.mathworks.sample.subgroup3');
```

# ModelAdvisor.List.addItem

---

**Purpose** Add item to list

**Syntax** `addItem(element)`

**Description** `addItem(element)` adds items to the list created by the `ModelAdvisor.List` constructor.

**Input Arguments**

<i>element</i>	Specifies an element to be added to a list in one of the following:
----------------	---

- Element
- Cell array of elements. When you add a cell array to a list, they form different rows in the list.
- String

## Examples

```
subList = ModelAdvisor.List();
setType(subList, 'numbered')
addItem(subList, ModelAdvisor.Text('Sub entry 1', {'pass', 'bold'}));
addItem(subList, ModelAdvisor.Text('Sub entry 2', {'pass', 'bold'}));
```

## See Also

“Model Advisor Customization”

## How To

- “Authoring Checks”



# ModelAdvisor.Paragraph.addItem

---

**Purpose** Add item to paragraph

**Syntax** addItem(text, element)

**Description** addItem(text, element) adds an element to text. element is one of the following:

- String
- Element
- Cell array of elements

**Examples** Add two lines of text:

```
result = ModelAdvisor.Paragraph;  
addItem(result, [resultText1 ModelAdvisor.LineBreak resultText2]);
```

**See Also** “Model Advisor Customization”

**How To** • “Authoring Checks”

# ModelAdvisor.Group.addProcedure

---

**Purpose** Add procedure to folder

**Syntax** `addProcedure(group_obj, procedure_obj)`

**Description** `addProcedure(group_obj, procedure_obj)` adds a procedure, specified by `procedure_obj`, to the folder `group_obj`. `group_obj` is an instantiation of the `ModelAdvisor.Group` class.

**Examples** Add three procedures to MAG.

```
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');

MAP1=ModelAdvisor.Procedure('com.mathworks.sample.procedure1');
MAP2=ModelAdvisor.Procedure('com.mathworks.sample.procedure2');
MAP3=ModelAdvisor.Procedure('com.mathworks.sample.procedure3');

addProcedure(MAG, MAP1);
addProcedure(MAG, MAP2);
addProcedure(MAG, MAP3);
```

# ModelAdvisor.Procedure.addProcedure

---

## Purpose

Add subprocedure to procedure

## Syntax

```
addProcedure(procedure1_obj, procedure2_obj)
```

## Description

`addProcedure(procedure1_obj, procedure2_obj)` adds a procedure, specified by `procedure2_obj`, to the procedure `procedure1_obj`. `procedure2_obj` and `procedure1_obj` are instantiations of the `ModelAdvisor.Procedure` class.

## Examples

Add three procedures to MAP.

```
MAP = ModelAdvisor.Procedure('com.mathworks.sample.ProcedureSample');
```

```
MAP1=ModelAdvisor.Procedure('com.mathworks.sample.procedure1');
```

```
MAP2=ModelAdvisor.Procedure('com.mathworks.sample.procedure2');
```

```
MAP3=ModelAdvisor.Procedure('com.mathworks.sample.procedure3');
```

```
addProcedure(MAP, MAP1);
```

```
addProcedure(MAP, MAP2);
```

```
addProcedure(MAP, MAP3);
```

# ModelAdvisor.FormatTemplate.addRow

---

**Purpose** Add row to table

**Syntax** `addRow(ft_obj, {item1, item2, ..., itemn})`

**Description** `addRow(ft_obj, {item1, item2, ..., itemn})` is an optional method that adds a row to the end of a table in the result. `ft_obj` is a handle to the template object previously created. `{item1, item2, ..., itemn}` is a cell array of strings and objects to add to the table. The order of the items in the array determines which column the item is in. If you do not add data to the table, the Model Advisor does not display the table in the result.

---

**Note** Before adding rows to a table, you must specify column titles using the `setColTitle` method.

---

**Examples** Find all of the blocks in the model and create a table of the blocks:

```
% Create FormatTemplate object, specify table format
ft = ModelAdvisor.FormatTemplate('TableTemplate');

% Add information to the table
setTableTitle(ft, {'Blocks in Model'});
setColTitles(ft, {'Index', 'Block Name'});
% Find all the blocks in the system and add them to a table.
allBlocks = find_system(system);
for inx = 2 : length(allBlocks)
    % Add information to the table
    addRow(ft, {inx-1,allBlocks(inx)});
end
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”
- “Format Model Advisor Results”

**Purpose** Add task to folder

**Syntax** `addTask(group_obj, task_obj)`

**Description** `addTask(group_obj, task_obj)` adds a task, specified by `task_obj`, to the folder `group_obj`. `group_obj` is an instantiation of the `ModelAdvisor.Group` class.

**Examples** Add three tasks to MAG.

```
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');  
addTask(MAG, MAT1);  
addTask(MAG, MAT2);  
addTask(MAG, MAT3);
```

# ModelAdvisor.Procedure.addTask

---

**Purpose** Add task to procedure

**Syntax** `addTask(procedure_obj, task_obj)`

**Description** `addTask(procedure_obj, task_obj)` adds a task, specified by `task_obj`, to `procedure_obj`. `procedure_obj` is an instantiation of the `ModelAdvisor.Procedure` class.

**Examples** Add three tasks to MAP.

```
MAP = ModelAdvisor.Procedure('com.mathworks.sample.ProcedureSample');
```

```
MAT1=ModelAdvisor.Task('com.mathworks.sample.task1');
```

```
MAT2=ModelAdvisor.Task('com.mathworks.sample.task2');
```

```
MAT3=ModelAdvisor.Task('com.mathworks.sample.task3');
```

```
addTask(MAP, MAT1);
```

```
addTask(MAP, MAT2);
```

```
addTask(MAP, MAT3);
```

# Advisor.authoring.generateConfigurationParameterDataFile

<b>Purpose</b>	Generate XML data file for custom configuration parameter check
<b>Syntax</b>	<pre>Advisor.authoring.generateConfigurationParameterDataFile(dataFile, source) Advisor.authoring.generateConfigurationParameterDataFile(dataFile, source,Name,Value)</pre>
<b>Description</b>	<p>Advisor.authoring.generateConfigurationParameterDataFile(dataFile, source) generates an XML data file named dataFile specifying the configuration parameters for source. The data file uses tagging to specify the configuration parameter settings you want. When you create a check for configuration parameters, you use the data file. Each model configuration parameter specified in the data file is a subcheck.</p> <p>Advisor.authoring.generateConfigurationParameterDataFile(dataFile, source,Name,Value) generates an XML data file named dataFile specifying the configuration parameters for source. It also specifies additional options by one or more optional Name,Value arguments. The data file uses tagging to specify the configuration parameter settings you want. When you create a check for configuration parameters, you use the data file. Each model configuration parameter specified in the data file is a subcheck.</p>
<b>Input Arguments</b>	<p><b>dataFile - Name of data file to create</b> string Name of XML data file to create, specified as a string. <b>Example:</b> 'myDataFile.xml'</p> <p><b>source - Name of model or configuration set</b> string   Simulink.ConfigSet Name of model or Simulink.ConfigSet object used to specify configuration parameters <b>Example:</b> 'vdp'</p>

## **Name-Value Pair Arguments**

Specify optional comma-separated pairs of `Name`, `Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside single quotes ( `' '` ). You can specify several name and value pair arguments in any order as `Name1,Value1,...,NameN,ValueN`.

**Example:** `'Pane', 'Solver', 'FixValues', true` specifies a `dataFile` with solver pane configuration parameters and fix tagging.

### **'Pane' - Limit the configuration parameters in the dataFile**

`Solver` | `Data Import/Export` | `Optimization` | `Diagnostics` |  
`Hardware Implementation` | `Model Referencing` | `Code Generation`

Option to limit the configuration parameters in the data file to the pane specified as the comma-separated pair of `'Pane'` and one of the following:

- `Solver`
- `Data Import/Export`
- `Optimization`
- `Diagnostics`
- `Hardware Implementation`
- `Model Referencing`
- `Code Generation`

**Example:** `'Pane', 'Solver'` limits the `dataFile` to configuration parameters on the solver pane.

### **Data Types**

`char`

### **'FixValues' - Create fix tagging in the dataFile**

`false` | `true`



Setting `FixValues` to `true` provides the `dataFile` with fix tagging. When you generate a custom configuration parameter check using a `dataFile` with fix tagging, each configuration parameter subcheck has a fix action. Specified as the comma-separated pair of `'FixValues'` and either `true` or `false`.

**Example:** `'FixValues,true'` specifies fix tagging in the `dataFile`.

## Data Types

logical

## Examples

### Create data file for configuration parameter check

Create a data file with all the configuration parameters. You use the data file to create a configuration parameter.

```
model = 'vdp';
dataFile = 'myDataFile.xml';
Advisor.authoring.generateConfigurationParameterDataFile( ...
    dataFile, model);
```

Data file `myDataFile.xml` has tagging specifying subcheck information for each configuration parameter. `myDataFile.xml` specifies the configuration parameters settings you want. The following specifies XML tagging for configuration parameter `AbsTol`. If the configuration parameter is set to `1e-6`, the configuration parameter subcheck specified in `myDataFile.xml` passes.

```
<!-- Absolute tolerance: (AbsTol)-->
  <PositiveModelParameterConstraint>
    <parameter>AbsTol</parameter>
    <value>1e-6</value>
  </PositiveModelParameterConstraint>
```

To specify configuration parameter settings you do not want, see “Data File for Configuration Parameter Check”.

## Create data file for solver pane configuration parameter check with fix action

Create a data file with configuration parameters for the solver pane. You use the data file to create a solver pane configuration parameter check with fix actions.

```
model = 'vdp';
dataFile = 'myDataFile.xml';
Advisor.authoring.generateConfigurationParameterDataFile( ...
    dataFile, model, 'Pane', 'Solver', 'FixValues', true);
```

Data file `myDataFile.xml` has tagging specifying subcheck information for each configuration parameter. `myDataFile.xml` specifies the configuration parameters settings that you want. The following specifies XML tagging for configuration parameter `AbsTol`. If the configuration parameter is set to `1e-6`, the configuration parameter subcheck specified in `myDataFile.xml` passes. If the subcheck does not pass, the check fix action modifies the configuration parameter to `1e-6`.

```
<!-- Absolute tolerance: (AbsTol)-->
  <PositiveModelParameterConstraint>
    <parameter>AbsTol</parameter>
    <value>1e-6</value>
    <fixvalue>1e-6</fixvalue>
  </PositiveModelParameterConstraint>
```

To specify configuration parameter settings you do not want, see “Data File for Configuration Parameter Check”.

## Related Examples

- “Create Check for Model Configuration Parameters”

## Concepts

- “Data File for Configuration Parameter Check”

<b>Purpose</b>	Define custom check				
<b>Description</b>	Instances of the <code>Advisor.authoring.CustomCheck</code> class provide a container for static methods used as callback functions when defining a configuration parameter check. The configuration parameter check is defined in an XML data file.				
<b>Methods</b>	<table><tr><td><code>actionCallback</code></td><td>Register action callback for model configuration check</td></tr><tr><td><code>checkCallback</code></td><td>Register check callback for model configuration check</td></tr></table>	<code>actionCallback</code>	Register action callback for model configuration check	<code>checkCallback</code>	Register check callback for model configuration check
<code>actionCallback</code>	Register action callback for model configuration check				
<code>checkCallback</code>	Register check callback for model configuration check				
<b>Copy Semantics</b>	Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB® Programming Fundamentals documentation.				
<b>See Also</b>	<code>Advisor.authoring.DataFile</code>   <code>Advisor.authoring.generateConfigurationParameterDataFile</code>				
<b>How To</b>	<ul style="list-style-type: none"><li>“Create Check for Model Configuration Parameters”</li></ul>				

# Advisor.authoring.DataFile

---

<b>Purpose</b>	Interact with data file for model configuration checks		
<b>Description</b>	The <code>Advisor.authoring.DataFile</code> class provides a container for a static method used when interacting with the data file for configuration parameter checks.		
<b>Methods</b>	<table><tr><td><code>validate</code></td><td>Validate XML data file used for model configuration check</td></tr></table>	<code>validate</code>	Validate XML data file used for model configuration check
<code>validate</code>	Validate XML data file used for model configuration check		
<b>Copy Semantics</b>	Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.		
<b>See Also</b>	<code>Advisor.authoring.CustomCheck</code>   <code>Advisor.authoring.generateConfigurationParameterDataFile</code>		
<b>How To</b>	<ul style="list-style-type: none"><li>• “Create Check for Model Configuration Parameters”</li></ul>		

- Purpose** Get names of all models associated with cvdata objects in cv.cvdatagroup
- Syntax** `models = allNames(cvdg)`
- Description** `models = allNames(cvdg)` returns a cell array of strings identifying all model names associated with the cvdata objects in cvdg, an instantiation of the cv.cvdatagroup class.
- Examples** Add three cvdata objects to cvdg and return a cell array of model names:
- ```
a = cvdata;  
b = cvdata;  
c = cvdata;  
cvdg = cv.cvdatagroup;  
add (cvdg, a, b, c);  
model_names = allNames(cvdg)
```

# Advisor.authoring.CustomCheck.checkCallback

---

**Purpose** Register check callback for model configuration check

**Syntax** `Advisor.authoring.CustomCheck.checkCallback(system)`

**Description** `Advisor.authoring.CustomCheck.checkCallback(system)` is used as the check callback function when registering custom checks that use an XML data file to specify check behavior.

**Examples** This `sl_customization.m` file registers a configuration parameter check using `Advisor.authoring.CustomCheck.checkCallback(system)`.

```
function defineModelAdvisorChecks

    rec = ModelAdvisor.Check('com.mathworks.Check1');
    rec.Title = 'Test: Check1';
    rec.setCallbackFcn(@(system)(Advisor.authoring.CustomCheck.checkCallback(system)),
        'None', 'StyleOne');
    rec.TitleTips = 'Example check for check authoring infrastructure.';

    % --- data file input parameters
    rec.setInputParametersLayoutGrid([1 1]);
    inputParam1 = ModelAdvisor.InputParameter;
    inputParam1.Name = 'Data File';
    inputParam1.Value = 'Check1.xml';
    inputParam1.Type = 'String';
    inputParam1.Description = 'Name or full path of XML data file.';
    inputParam1.setRowSpan([1 1]);
    inputParam1.setColSpan([1 1]);
    rec.setInputParameters({inputParam1});

    % -- set fix operation
    act = ModelAdvisor.Action;
    act.setCallbackFcn(@(task)(Advisor.authoring.CustomCheck.actionCallback(task)));
    act.Name = 'Modify Settings';
    act.Description = 'Modify model configuration settings.';
    rec.setAction(act);
```

# Advisor.authoring.CustomCheck.checkCallback

---

```
mdladvRoot = ModelAdvisor.Root;  
mdladvRoot.register(rec);  
end
```

## See Also

Advisor.authoring.DataFile |  
Advisor.authoring.CustomCheck.actionCallback |  
Advisor.authoring.generateConfigurationParameterDataFile

## How To

- “Create Check for Model Configuration Parameters”

# complexityinfo

---

**Purpose** Retrieve cyclomatic complexity coverage information from cvdata object

**Syntax** `complexity = complexityinfo(cvdo, object)`

**Description** `complexity = complexityinfo(cvdo, object)` returns complexity coverage results from the cvdata object `cvdo` for the model component `object`.

**Input Arguments**

**cvdo**  
cvdata object

**object**

The `object` argument specifies an object in the model or Stateflow<sup>®</sup> chart that received decision coverage. Valid values for `object` include the following:

**Object Specification**

**Description**

BlockPath

Full path to a model or block

BlockHandle

Handle to a model or block

s1obj

Handle to a Simulink<sup>®</sup> API object

sfID

Stateflow ID

sfObj

Handle to a Stateflow API object from a singly instantiated Stateflow chart

{BlockPath, sfID}

Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart



## Object Specification

{BlockPath, sfObj}

[BlockHandle, sfID]

## Description

Cell array with the path to a Stateflow chart or subchart and a Stateflow object API handle contained in that chart or subchart

Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

## Output Arguments

### complexity

If `cvdo` does not contain cyclomatic complexity coverage results for `object`, `complexity` is empty.

If `cvdo` contains cyclomatic complexity coverage results for `object`, `complexity` is a two-element vector of the form [`total_complexity` `local_complexity`]:

|                               |                                                                                     |
|-------------------------------|-------------------------------------------------------------------------------------|
| <code>total_complexity</code> | Cyclomatic complexity coverage for <code>object</code> and its descendants (if any) |
| <code>local_complexity</code> | Cyclomatic complexity coverage for <code>object</code>                              |

If `object` has variable-size signals, `complexity` also contains the variable complexity.

## Examples

Open the `sldemo_fuelsys` model and create the test specification object `testObj`. Enable decision, condition, and MCDC coverage for `sldemo_fuelsys` and execute `testObj` using `cvsim`. Use `complexityinfo` to retrieve cyclomatic complexity results for the Throttle subsystem. The Throttle subsystem itself does not record cyclomatic complexity coverage results, but the contents of the subsystem do record cyclomatic complexity coverage.

```
mdl = 'sldemo_fuelsys';
open_system(mdl);
testObj = cvtest(mdl)
testObj.settings.decision = 1;
testObj.settings.condition = 1;
testObj.settings.mcdc = 1;
data = cvsim(testObj);
blk_handle = get_param([mdl, ...
    '/Engine Gas Dynamics/Throttle & Manifold/Throttle'],...
    'Handle');
coverage = complexityinfo(data, blk_handle);
coverage
```

## Alternatives

Use the Coverage Settings dialog box to collect and display cyclomatic complexity coverage results in the coverage report:

- 1 Open the model.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** tab, select **Coverage for this model**.
- 4 Under **Coverage metrics**, select:
  - **Decision**
  - **Condition**
  - **MCDC**
- 5 On the **Reporting** tab, click **HTML Settings**.
- 6 In the HTML Settings dialog box, select:
  - **Include cyclomatic complexity numbers in summary**
  - **Include cyclomatic complexity numbers in block details**
- 7 Click **OK** to close the HTML Settings dialog box and save your changes.

- 8 Click **OK** to close the Coverage Settings dialog box and save your changes.
- 9 Simulate the model and review the results in the HTML report.

## See Also

`conditioninfo` | `decisioninfo` | `cvsim` | `getCoverageInfo` | `mcdcinfo` | `sigrangeinfo` | `sigsizeinfo` | `tableinfo`

## How To

- “Cyclomatic Complexity”

# conditioninfo

---

**Purpose** Retrieve condition coverage information from cvdata object

**Syntax**

```
coverage = conditioninfo(cvdo, object)
coverage = conditioninfo(cvdo, object, ignore_descendants)
[coverage, description] = conditioninfo(cvdo, object)
```

**Description** `coverage = conditioninfo(cvdo, object)` returns condition coverage results from the cvdata object `cvdo` for the model component specified by `object`.

`coverage = conditioninfo(cvdo, object, ignore_descendants)` returns condition coverage results for `object`, depending on the value of `ignore_descendants`.

`[coverage, description] = conditioninfo(cvdo, object)` returns condition coverage results and textual descriptions of each condition in `object`.

## Input Arguments

### **cvdo**

cvdata object

### **object**

An object in the Simulink model or Stateflow diagram that receives decision coverage. Valid values for `object` are as follows:

|             |                                        |
|-------------|----------------------------------------|
| BlockPath   | Full path to a Simulink model or block |
| BlockHandle | Handle to a Simulink model or block    |
| s1obj       | Handle to a Simulink API object        |
| sfID        | Stateflow ID                           |
| sfObj       | Handle to a Stateflow API object       |

|                                  |                                                                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <code>{BlockPath, sfID}</code>   | Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart           |
| <code>{BlockPath, sfObj}</code>  | Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart |
| <code>[BlockHandle, sfID]</code> | Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart                |

## **ignore\_descendants**

Logical value that specifies whether to ignore the coverage of descendant objects

- 1 to ignore coverage of descendant objects
- 0 (default) to collect coverage of descendant objects

## **Output Arguments**

### **coverage**

The value of coverage is a two-element vector of form `[covered_outcomes total_outcomes]`. coverage is empty if cvdo does not contain condition coverage results for object. The two elements are:

|                               |                                                   |
|-------------------------------|---------------------------------------------------|
| <code>covered_outcomes</code> | Number of condition outcomes satisfied for object |
| <code>total_outcomes</code>   | Total number of condition outcomes for object     |

### **description**

# conditioninfo

---

A structure array with the following fields:

|                        |                                                                     |
|------------------------|---------------------------------------------------------------------|
| <code>text</code>      | String describing a condition or the block port to which it applies |
| <code>trueCnts</code>  | Number of times the condition was true in a simulation              |
| <code>falseCnts</code> | Number of times the condition was false in a simulation             |

## Examples

The following example opens the `slvndemo_cv_small_controller` example model, creates the test specification object `testObj`, enables condition coverage for `testObj`, and executes `testObj`. Then retrieve the condition coverage results for the Logic block (in the Gain subsystem) and determine its percentage of condition outcomes covered:

```
mdl = 'slvndemo_cv_small_controller';
open_system(mdl)
testObj = cvtest(mdl)
testObj.settings.condition = 1;
data = cvsim(testObj)
blk_handle = get_param([mdl, '/Gain/Logic'], 'Handle');
cov = conditioninfo(data, blk_handle)
percent_cov = 100 * cov(1) / cov(2)
```

## Alternatives

Use the Coverage Settings dialog box to collect condition coverage for a model:

- 1** Open the model for which you want to collect condition coverage.
- 2** In the Model Editor, select **Analysis > Coverage > Settings**.
- 3** On the **Coverage** tab, select **Coverage for this model**.
- 4** Under **Coverage metrics**, select **Condition**.
- 5** On the **Results** and **Reporting** tabs, specify the output you need.

**6** Click **OK** to close the Coverage Settings dialog box and save your changes.

**7** Simulate the model and review the results.

## See Also

[complexityinfo](#) | [cvsim](#) | [decisioninfo](#) | [getCoverageInfo](#) | [mcdcinfo](#) | [overflowsaturationinfo](#) | [sigrangeinfo](#) | [sigsizeinfo](#) | [tableinfo](#)

## How To

- “Condition Coverage (CC)”

# cv.cvdatagroup

---

|                       |                                                                                                                                                             |                                                                          |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Purpose</b>        | Collection of cvdata objects                                                                                                                                |                                                                          |
| <b>Description</b>    | Instances of this class contain a collection of cvdata objects. Each cvdata object contains coverage results for a particular model in the model hierarchy. |                                                                          |
| <b>Construction</b>   | cv.cvdatagroup                                                                                                                                              | Create collection of cvdata objects for model reference hierarchy        |
| <b>Methods</b>        | allNames                                                                                                                                                    | Get names of all models associated with cvdata objects in cv.cvdatagroup |
|                       | get                                                                                                                                                         | Get cvdata object                                                        |
|                       | getAll                                                                                                                                                      | Get all cvdata objects                                                   |
| <b>Properties</b>     | name                                                                                                                                                        | cv.cvdatagroup object name                                               |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.                          |                                                                          |



**Purpose** Create collection of cvdata objects for model reference hierarchy

**Syntax** `cvdg = cv.cvdatagroup(cvdo1, cvdo2, ...)`

**Description** `cvdg = cv.cvdatagroup(cvdo1, cvdo2, ...)` creates an instantiation of the `cv.cvdatagroup` class (`cvdg`) that contains the `cvdata` objects `cvdo1`, `cvdo2`, etc. A `cvdata` object contains results of the simulation runs.

**Examples** Create an instantiation of the `cv.cvdatagroup` class and add two `cvdata` objects to it:

```
a = cvdata;  
b = cvdata;  
cvdg = cv.cvdatagroup(a, b);
```

# cvexit

---

**Purpose** Exit model coverage environment

**Syntax** `cvexit`

**Description** `cvexit` exits the model coverage environment. Issuing this command closes the Coverage Display window and removes coloring from a block diagram that displays its model coverage results.

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Produce HTML report from model coverage objects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax</b>          | <pre>cvhtml(file, cvdo) cvhtml(file, cvdo1, cvdo2, ...) cvhtml(file, cvdo1, cvdo2, ..., options) cvhtml(file, cvdo1, cvdo2, ..., options, detail)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>     | <p><code>cvhtml(file, cvdo)</code> creates an HTML report of the coverage results in the <code>cvdata</code> or <code>cv.cvdatagroup</code> object <code>cvdo</code> when you run model coverage in simulation. <code>cvhtml</code> saves the coverage results in <code>file</code>. The model must be open when you use <code>cvhtml</code> to generate its coverage report.</p> <p><code>cvhtml(file, cvdo1, cvdo2, ...)</code> creates a combined report of several <code>cvdata</code> objects. The results from each object appear in a separate column of the HTML report. Each <code>cvdata</code> object must correspond to the same root model or subsystem. Otherwise, the function fails.</p> <p><code>cvhtml(file, cvdo1, cvdo2, ..., options)</code> creates a combined report of several <code>cvdata</code> objects using the report options specified by <code>options</code>.</p> <p><code>cvhtml(file, cvdo1, cvdo2, ..., options, detail)</code> creates a combined coverage report for several <code>cvdata</code> objects and specifies the detail level of the report with the value of <code>detail</code>.</p> |
| <b>Input Arguments</b> | <p><b>cvdo</b><br/>A <code>cv.cvdatagroup</code> object</p> <p><b>detail</b><br/>Specifies the level of detail in the report. Set <code>detail</code> to an integer from 0 to 3. Greater numbers for <code>detail</code> indicate greater detail.</p> <p><b>Default:</b> 2</p> <p><b>file</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

String specifying the HTML file in the MATLAB current folder where cvhtml stores the results

**Default:** []

## **options**

Specify the report options that you specify in options:

- To enable an option, set it to 1 (e.g., '-hTR=1').
- To disable an option, set it to 0 (e.g., '-bRG=0').
- To specify multiple report options, list individual options in a single options string separated by commas or spaces (e.g., '-hTR=1 -bRG=0 -scm=0').

The following table lists all the options:

| <b>Option</b> | <b>Description</b>                                     | <b>Default</b> |
|---------------|--------------------------------------------------------|----------------|
| -sRT          | Show report                                            | on             |
| -aTS          | Include each test in the model summary                 | on             |
| -bRG          | Produce bar graphs in the model summary                | on             |
| -bTC          | Use two color bar graphs (red, blue)                   | on             |
| -hTR          | Display hit/count ratio in the model summary           | off            |
| -nFC          | Do not report fully covered model objects              | off            |
| -scm          | Include cyclomatic complexity numbers in summary       | on             |
| -bcm          | Include cyclomatic complexity numbers in block details | on             |
| -xEv          | Filter Stateflow events from report                    | off            |

## Examples

Make sure you have write access to the default MATLAB folder. Create a cumulative coverage report for the `slvndemo_cv_small_controller` mode and save it as `ratelim_coverage.html`:

```
model = 'slvndemo_cv_small_controller';  
open_system(model);  
cvt = cvtest(model);  
cvd = cvsimsim(cvt);  
outfile = 'ratelim_coverage.html';  
cvhtml(outfile, cvd);
```

## Alternatives

Use the Coverage Settings dialog box to create a model coverage report in an HTML file:

- 1** Open the model for which you want a model coverage report.
- 2** In the Simulink Editor, select **Analysis > Coverage > Settings**.
- 3** On the **Coverage** tab, select **Coverage for this model**.
- 4** On the **Report** tab, select **Generate HTML report**.
- 5** Click **OK** to close the Coverage Settings dialog box and save your changes.
- 6** Simulate the model and review the generated report.

## See Also

`cv.cvdgroup` | `cvmodelview` | `cvsimsim`

## How To

- “Create HTML Reports with `cvhtml`”

# cvload

---

**Purpose** Load coverage tests and stored results into memory

**Syntax** `[tests, data] = cvload(filename)`  
`[tests, data] = cvload(filename, restoretotal)`

**Description** `[tests, data] = cvload(filename)` loads the tests and data stored in the text file `filename.cvt`. `tests` is a cell array of `cvtest` objects that are loaded. `data` is a cell array of `cvdata` objects that are loaded. `data` has the same size as `tests`, but if a particular test has no results, `data` can contain empty elements.

`[tests, data] = cvload(filename, restoretotal)` restores or clears the cumulative results from prior runs, depending on the value of `restoretotal`. If `restoretotal` is 1, `cvload` restores the cumulative results from prior runs. If `restoretotal` is unspecified or 0, `cvload` clears the model's cumulative results.

The following are special considerations for using the `cvload` command:

- If a model with the same name exists in the coverage database, the software loads only the compatible results that reference the existing model to prevent duplication.
- If the Simulink models referenced from the file are open but do not exist in the coverage database, the coverage tool resolves the links to the existing models.
- When you are loading several files that reference the same model, the software loads only the results that are consistent with the earlier files.

**Examples** Store coverage results in `cvtest` and `cvdata` objects:

```
[test_objects, data_objects] = cvload(test_results, 1);
```

**See Also** `cvsave`

**How To** • “Load Stored Coverage Test Results with `cvload`”

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>      | Display model coverage results with model coloring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>       | <code>cvmodelview(cvdo)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>  | <code>cvmodelview(cvdo)</code> displays coverage results from the <code>cvdata</code> object <code>cvdo</code> by coloring the objects in the model that have model coverage results.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Examples</b>     | <p>Open the <code>slvndemo_cv_small_controller</code> example model, create the test specification object <code>testObj</code>, and execute <code>testObj</code> to collect model coverage. Run <code>cvmodelview</code> to color the model objects for which you collect model coverage information:</p> <pre>mdl = 'slvndemo_cv_small_controller'; open_system(mdl) testObj = cvtest(mdl) data = cvsim(testObj) cvmodelview(data)</pre>                                                                                                                                                                          |
| <b>Alternatives</b> | <p>Use the Coverage Settings dialog box to display model coverage results by coloring objects:</p> <ol style="list-style-type: none"> <li><b>1</b> Open the model.</li> <li><b>2</b> Select <b>Analysis &gt; Coverage &gt; Settings</b>.</li> <li><b>3</b> On the <b>Coverage</b> tab, select <b>Coverage for this model</b>.</li> <li><b>4</b> On the <b>Results</b> tab, select <b>Display coverage results using model coloring</b>.</li> <li><b>5</b> Click <b>OK</b> to close the Coverage Settings dialog box and save your changes.</li> <li><b>6</b> Simulate the model and review the results.</li> </ol> |
| <b>See Also</b>     | <code>cvhtml</code>   <code>cvsim</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## **How To**

- “Enable Coverage Highlighting”
-



**Purpose** Save coverage tests and results to file

**Syntax**

```
cvsave(filename, model)
cvsave(filename, cvto1, cvto2, ...)
cvsave(filename, cell_array{ :})
```

**Description**

`cvsave(filename, model)` saves all the tests (cvtest objects) and results (cvdata objects) related to `model` in the text file `filename.cvt`. `model` is a handle to or name of a Simulink model.

`cvsave(filename, cvto1, cvto2, ...)` saves multiple cvtest objects in the text file `filename.cvt`. `cvsave` also saves information about any referenced models.

`cvsave(filename, cell_array{ :})` saves the test results stored in each element of `cell_array` to the file `filename.cvt`. Each element in `cell_array` contains test results for a cvdata object.

**Input Arguments**

**filename**

String containing the name of the file in which to save the data. `cvsave` appends the extension `.cvt` to the string when saving the file.

**model**

Handle to a Simulink model

**cvto**

cvtest object

**cell\_array**

Cell array of cvtest objects

**Examples**

Save coverage results for the `slvndemo_cv_small_controller` model in `ratelim_testdata.cvt`:

```
model = 'slvndemo_cv_small_controller';
```

```
open_system(model);
cvt = cvtest(model);
cvt = cvsim(cvt);
cvsave('ratelim_testdata', model);
```

---

Save cumulative coverage results for the Adjustable Rate Limiter subsystem in the `slvndemo_ratelim_harness` model from two simulations:

```
% Open model and subsystem
mdl = 'slvndemo_ratelim_harness';
mdl_subsys = ...
    'slvndemo_ratelim_harness/Adjustable Rate Limiter';
open_system(mdl);
open_system(mdl_subsys);

% Create data files
t_gain = (0:0.02:2.0)';
u_gain = sin(2*pi*t_gain);
t_pos = [0;2];
u_pos = [1;1];
t_neg = [0;2];
u_neg = [-1;-1];
save('within_lim.mat', 't_gain', 'u_gain', 't_pos', 'u_pos', ...
    't_neg', 'u_neg');

t_gain = [0;2];
u_gain = [0;4];
t_pos = [0;1;1;2];
u_pos = [1;1;5;5]*0.02;
t_neg = [0;2];
u_neg = [0;0];
save('rising_gain.mat', 't_gain', 'u_gain', 't_pos', 'u_pos', ...
    't_neg', 'u_neg');

% Specify coverage options in cvtest object
```

```
testObj1 = cvtest mdl_subsys);
testObj1.label = 'Gain within slew limits';
testObj1.setupCmd = 'load(''within_lim.mat'');';
testObj1.settings.mcdc = 1;
testObj1.settings.condition = 1;
testObj1.settings.decision = 1;

testObj2 = cvtest mdl_subsys);
testObj2.label = ...
    'Rising gain that temporarily exceeds slew limit';
testObj2.setupCmd = 'load(''rising_gain.mat'');';
testObj2.settings.mcdc = 1;
testObj2.settings.condition = 1;
testObj2.settings.decision = 1;

% Simulate the model with both cvtest objects
[dataObj1,simOut1] = cvsim(testObj1);
[dataObj2,simOut2] = cvsim(testObj2,[0 2]);

cumulative = dataObj1+dataObj2;
cvsave('ratelim_testdata',cumulative);
```

---

As in the preceding example, save cumulative coverage results for the Adjustable Rate Limiter subsystem in the `slvnvdemo_ratelim_harness` model from two simulations. Save the results in a cell array and then save the data to a file:

```
% Open model and subsystem
mdl = 'slvnvdemo_ratelim_harness';
mdl_subsys = ...
    'slvnvdemo_ratelim_harness/Adjustable Rate Limiter';
open_system(mdl);
open_system(mdl_subsys);

% Create data files
t_gain = (0:0.02:2.0)';
```

```
u_gain = sin(2*pi*t_gain);
t_pos = [0;2];
u_pos = [1;1];
t_neg = [0;2];
u_neg = [-1;-1];
save('within_lim.mat', 't_gain', 'u_gain', 't_pos', 'u_pos', ...
     't_neg', 'u_neg');

t_gain = [0;2];
u_gain = [0;4];
t_pos = [0;1;1;2];
u_pos = [1;1;5;5]*0.02;
t_neg = [0;2];
u_neg = [0;0];
save('rising_gain.mat', 't_gain', 'u_gain', 't_pos', 'u_pos', ...
     't_neg', 'u_neg');

% Specify coverage options in cvtest object
testObj1 = cvtest mdl_subsys;
testObj1.label = 'Gain within slew limits';
testObj1.setupCmd = 'load(''within_lim.mat'');';
testObj1.settings.mcdc = 1;
testObj1.settings.condition = 1;
testObj1.settings.decision = 1;

testObj2 = cvtest mdl_subsys;
testObj2.label = ...
    'Rising gain that temporarily exceeds slew limit';
testObj2.setupCmd = 'load(''rising_gain.mat'');';
testObj2.settings.mcdc = 1;
testObj2.settings.condition = 1;
testObj2.settings.decision = 1;

% Simulate the model with both cvtest objects
[dataObj1, simOut1] = cvsim(testObj1);
[dataObj2, simOut2] = cvsim(testObj2, [0 2]);
```

```
% Save the results in the cell array
cov_results{1} = dataObj1;
cov_results{2} = dataObj2;

% Save the results to a file
cvsave('ratelim_testdata', cov_results{ :});
```

## Alternatives

Use the Coverage Settings dialog box to save cumulative coverage results for a model:

- 1** Open the model for which you want to save cumulative coverage results.
- 2** In the Model Editor, select **Analysis > Coverage > Settings**.
- 3** On the **Coverage** tab, select **Coverage for this model**.
- 4** On the **Results** tab:
  - a** Select **Save cumulative results in workspace variable**.
  - b** Select **Save last run in workspace variable**.
- 5** Click **OK** to close the Coverage Settings dialog box and save your changes.
- 6** Simulate the model and review the results.

## See Also

cvload

## How To

- “Save Test Runs to a File with cvsave”

**Purpose** Simulate and return model coverage results for test objects

**Syntax**

```
cvdo = cvsim(cvto)
[cvdo,simOut] = cvsim(cvto,Name1,Value1,Name2,Value2,...)
[cvdo,simOut] = cvsim(cvto,ParameterStruct)
[cvdo1,cvdo2,...,simOut] = cvsim(cvto1,cvto2,...)
```

**Description**

`cvdo = cvsim(cvto)` simulates the model and returns the coverage results for the `cvtest` object, `cvto`. `cvsim` saves the coverage results in the `cvdata` object, `cvdo`. However, when recording coverage for multiple models in a hierarchy, `cvsim` returns the coverage results in a `cv.cvdatalog` object.

`[cvdo,simOut] = cvsim(cvto,Name1,Value1,Name2,Value2,...)` specifies the model parameters and simulates the model. `cvsim` returns the coverage results in the `cvdata` object, `cvdo`, and returns the simulation outputs in the `Simulink.SimulationOutput` object, `simOut`.

`[cvdo,simOut] = cvsim(cvto,ParameterStruct)` sets the model parameters specified in a structure `ParameterStruct`, simulates the model, returns the coverage results in `cvdo`, and returns the simulation outputs in `simOut`.

`[cvdo1,cvdo2,...,simOut] = cvsim(cvto1,cvto2,...)` simulates the model and returns the coverage results for the test objects, `cvto1`, `cvto2`, .... `cvdo1` contains the coverage results for `cvto1`, `cvdo2` contains the coverage results for `cvto2`, and so on.

---

**Note** Even if you have not enabled coverage recording for the model, you can execute the `cvsim` command to record coverage for your model.

---

**Input Arguments**

**cvto**  
cvtest object that specifies coverage options for the simulation

## Name-Value Pair Arguments

Specify optional comma-separated pairs of **Name**, **Value** arguments. **Name** is the argument name and **Value** is the corresponding value. **Name** must appear inside single quotes ( ' '). You can specify several name and value pair arguments in any order as **Name1**, **Value1**, . . . , **NameN**, **ValueN**.

### 'ParameterName'

Name of the model parameter to be specified for simulation

### 'ParameterValue'

Value of the model parameter

---

**Note** For a complete list of model parameters, see “Model Parameters” in the Simulink documentation.

---

## Output Arguments

### **cvdo**

cvdata object

### **simOut**

A Simulink.SimulationOutput object that contains the simulation outputs.

## Examples

Open the `sldemo_engine` example model, create the test object, set the model parameters, and simulate the model. `cvsim` returns the coverage data in `cvdo` and the simulation outputs in the Simulink.SimulationOutput object, `simOut`:

```
model = 'sldemo_engine';
open_system(model);
testObj = cvtest(model);           % Get test data
testObj.settings.decision = 1;
```

```
paramStruct.AbsTo1      = '1e-5';
paramStruct.SaveState   = 'on';
paramStruct.StateSaveName = 'xoutNew';
paramStruct.SaveOutput  = 'on';
paramStruct.OutputSaveName = 'youtNew';
[cvdo,simOut] = cvsim(testObj,paramStruct); % Get coverage
cvhtml('CoverageReport.html', cvdo);      % Create HTML Report
```

## See Also

[cv.cvatagroup](#) | [cvtest](#) | [sim](#)



**Purpose** Create model coverage test specification object

**Syntax**

```

cvto = cvtest(root)
cvto = cvtest(root, label)
cvto = cvtest(root, label, setupcmd)
    
```

**Description**

`cvto = cvtest(root)` creates a test specification object with the handle `cvto`. Simulate `cvto` with the `cvsim` command.

`cvto = cvtest(root, label)` creates a test object with the label `label`, which is used for reporting results.

`cvto = cvtest(root, label, setupcmd)` creates a test object with the setup command `setupcmd`.

**Input Arguments**

**root**  
Name or handle for a Simulink model or a subsystem. Only the specified model or subsystem and its descendants are subject to model coverage testing.

**label**  
Label for test object

**setupcmd**  
Setup command for creating test object. The setup command is executed in the base MATLAB workspace just prior to running the simulation. This command is useful for loading data prior to a test.

**Output Arguments**

**cvto**  
A test specification object with the following structure.

| <b>Field</b>          | <b>Description</b>    |
|-----------------------|-----------------------|
| <code>id</code>       | Read-only internal ID |
| <code>modelcov</code> | Read-only internal ID |

| <b>Field</b>                                  | <b>Description</b>                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>rootPath</code>                         | Name of system or subsystem for analysis                                                                                                                                                                                                                                                              |
| <code>label</code>                            | String used when reporting results                                                                                                                                                                                                                                                                    |
| <code>setupCmd</code>                         | Command executed in base workspace prior to simulation                                                                                                                                                                                                                                                |
| <code>settings.condition</code>               | Set to 1 for condition coverage.                                                                                                                                                                                                                                                                      |
| <code>settings.decision</code>                | Set to 1 for decision coverage.                                                                                                                                                                                                                                                                       |
| <code>settings.designverifier</code>          | Set to 1 for coverage for Simulink Design Verifier™ blocks.                                                                                                                                                                                                                                           |
| <code>settings.mcdc</code>                    | Set to 1 for MCDC coverage.                                                                                                                                                                                                                                                                           |
| <code>settings.sigrange</code>                | Set to 1 for signal range coverage.                                                                                                                                                                                                                                                                   |
| <code>settings.sigsize</code>                 | Set to 1 for signal size coverage.                                                                                                                                                                                                                                                                    |
| <code>settings.tableExec</code>               | Set to 1 for lookup table coverage.                                                                                                                                                                                                                                                                   |
| <code>modelRefSettings.enable</code>          | <ul style="list-style-type: none"><li>• 'off' — Disables coverage for all referenced models.</li><li>• 'all' or on — Enables coverage for all referenced models.</li><li>• 'filtered' — Enables coverage only for referenced models not listed in the <code>excludedModels</code> subfield.</li></ul> |
| <code>modelRefSettings.excludeTopModel</code> | Set to 1 to exclude coverage for the top model                                                                                                                                                                                                                                                        |
| <code>modelRefSettings.excludedModels</code>  | String specifying a comma-separated list of referenced models for which coverage is disabled.                                                                                                                                                                                                         |
| <code>emlSettings.enableExternal</code>       | Set to 1 to enable coverage for external program files called by MATLAB functions in your model.                                                                                                                                                                                                      |

| Field                           | Description                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| options.<br>forceBlockReduction | Set to 1 to override the Simulink <b>Block reduction</b> parameter if it is enabled.                                                         |
| filter.fileName                 | String specifying name of coverage filter file, if you have excluded objects from coverage recording. See “Coverage Filter Rules and Files”. |

## Examples

Create a `cvtest` object for the Adjustable Rate Limiter block in the `slvndemo_ratelim_harness` model. Simulate and get coverage data using `cvsim`.

```
open_system('slvndemo_ratelim_harness');
testObj = cvtest(['slvndemo_ratelim_harness', ...
    '/Adjustable Rate Limiter']);
testObj.label = 'Gain within slew limits';
testObj.setupCmd = ...
    'load(''slvndemo_ratelim_harness_data.mat'');';
testObj.settings.decision = 1;
testObj.settings.overflowsaturation = 1;
cvdo = cvsim(testObj);
```

## See Also

`cvsim` | `cv.cvdatabgroup`

## How To

- “Create Tests with `cvtest`”

# decisioninfo

---

**Purpose** Retrieve decision coverage information from cvdata object

**Syntax**

```
coverage = decisioninfo(cvdo, object)
coverage = decisioninfo(cvdo, object, ignore_descendants)
[coverage, description] = decisioninfo(cvdo, object)
```

**Description** `coverage = decisioninfo(cvdo, object)` returns decision coverage results from the cvdata object `CVDO` for the model component specified by `object`.

`coverage = decisioninfo(cvdo, object, ignore_descendants)` returns decision coverage results for `object`, depending on the value of `ignore_descendants`.

`[coverage, description] = decisioninfo(cvdo, object)` returns decision coverage results and text descriptions of decision points associated with `object`.

## Input Arguments

**cvdo**  
cvdata object

**object**  
The `object` argument specifies an object in the model or Stateflow chart that received decision coverage. Valid values for `object` include the following:

| Object Specification | Description                                                                 |
|----------------------|-----------------------------------------------------------------------------|
| BlockPath            | Full path to a model or block                                               |
| BlockHandle          | Handle to a model or block                                                  |
| s1obj                | Handle to a Simulink API object                                             |
| sfID                 | Stateflow ID                                                                |
| sfObj                | Handle to a Stateflow API object from a singly instantiated Stateflow chart |

**Object Specification**

{BlockPath, sfID}

**Description**

Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

{BlockPath, sfObj}

Cell array with the path to a Stateflow chart or subchart and a Stateflow object API handle contained in that chart or subchart

[BlockHandle, sfID]

Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

**ignore\_descendants**

Specifies to ignore the coverage of descendant objects if ignore\_descendants is set to 1.

**Output Arguments**

**coverage**

The value of coverage is a two-element vector of the form [covered\_outcomes total\_outcomes].coverage is empty if cvdo does not contain decision coverage results for object. The two elements are:

covered\_outcomes

Number of decision outcomes satisfied for object

total\_outcomes

Number of decision outcomes for object

**description**

description is a structure array containing the following fields:

# decisioninfo

---

|                                              |                                                               |
|----------------------------------------------|---------------------------------------------------------------|
| <code>decision.text</code>                   | String describing a decision point, e.g., 'U > LL'            |
| <code>decision.outcome.text</code>           | String describing a decision outcome, i.e., 'true' or 'false' |
| <code>decision.outcome.executionCount</code> | Number of times a decision outcome occurred in a simulation   |

## Examples

Open the `slvndemo_cv_small_controller` model and create the test specification object `testObj`. Enable decision coverage for `slvndemo_cv_small_controller` and execute `testObj` using `cvsim`. Use `decisioninfo` to retrieve the decision coverage results for the Saturation block and determine the percentage of decision outcomes covered:

```
mdl = 'slvndemo_cv_small_controller';
open_system(mdl)
testObj = cvtest(mdl)
testObj.settings.decision = 1;
data = cvsim(testObj)
blk_handle = get_param([mdl, '/Saturation'], 'Handle');
cov = decisioninfo(data, blk_handle)
percent_cov = 100 * cov(1) / cov(2)
```

## Alternatives

Use the Coverage Settings dialog box to collect and display decision coverage results:

- 1 Open the model.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** tab, select **Coverage for this model**.
- 4 Under **Coverage metrics**, select **Decision**.
- 5 On the **Results** and **Reporting** tabs, specify the output you need.

**6** Click **OK** to close the Coverage Settings dialog box and save your changes.

**7** Simulate the model and review the results.

## See Also

[complexityinfo](#) | [conditioninfo](#) | [cvsim](#) | [getCoverageInfo](#) | [mcdcinfo](#) | [overflowsaturationinfo](#) | [sigrangeinfo](#) | [sigsizeinfo](#) | [tableinfo](#)

## How To

- “Decision Coverage (DC)”

# cv.cvdatagroup.get

---

**Purpose** Get cvdata object

**Syntax** `get(cvdg, model_name)`

**Description** `get(cvdg, model_name)` returns the cvdata object in the `cv.cvdatagroup` object `cvdg` that corresponds to the model specified in `model_name`.

**Examples** Get a cvdata object from the specified Simulink model:

```
get(cvdg, 'slvndemo_cv_small_controller');
```



|                    |                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Get all cvdata objects                                                                                                   |
| <b>Syntax</b>      | <code>getAll(cvdo)</code>                                                                                                |
| <b>Description</b> | <code>getAll(cvdo)</code> returns all cvdata objects in the <code>cv.cvdatagroup</code> object <code>cvdo</code> .       |
| <b>Examples</b>    | Return all cvdata objects from the specified Simulink model:<br><pre>getAll(cvdg, 'slvndemo_cv_small_controller');</pre> |

# getCoverageInfo

---

**Purpose** Retrieve coverage information for Simulink Design Verifier blocks from cvdata object

**Syntax**

```
[coverage, description] = getCoverageInfo(cvdo, object)
[coverage, description] = getCoverageInfo(cvdo,
object, metric)
[coverage, description] = getCoverageInfo(cvdo,
object, metric,
ignore_descendants)
```

**Description** [coverage, description] = getCoverageInfo(cvdo, object) collects Simulink Design Verifier coverage for object, based on coverage results in cvdo. object is a handle to a block, subsystem, or Stateflow chart. getCoverageData returns coverage data only for Simulink Design Verifier library blocks in object's hierarchy.

[coverage, description] = getCoverageInfo(cvdo, object, metric) returns coverage data for the block type specified in metric. If object does not match the block type, getCoverageInfo does not return data.

[coverage, description] = getCoverageInfo(cvdo, object, metric, ignore\_descendants) returns coverage data about object, omitting coverage data for its descendant objects if ignore\_descendants equals 1.

## Input Arguments

**cvdo**  
cvdata object

### **object**

In the model or Stateflow chart, object that received Simulink Design Verifier coverage. The following are valid values for object.

|             |                               |
|-------------|-------------------------------|
| BlockPath   | Full path to a model or block |
| BlockHandle | Handle to a model or block    |

|                                  |                                                                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <code>s1Obj</code>               | Handle to a Simulink API object                                                                                                        |
| <code>sfID</code>                | Stateflow ID from a singly instantiated Stateflow chart                                                                                |
| <code>sfObj</code>               | Handle to a Stateflow API object from a singly instantiated Stateflow chart                                                            |
| <code>{BlockPath, sfID}</code>   | Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart           |
| <code>{BlockPath, sfObj}</code>  | Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart |
| <code>[BlockHandle, sfID]</code> | Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart                |

## **metric**

`cvmetric.Sldv` enumeration object with values that correspond to Simulink Design Verifier library blocks.

|                         |                        |
|-------------------------|------------------------|
| <code>test</code>       | Test Objective block   |
| <code>proof</code>      | Proof Objective block  |
| <code>condition</code>  | Test Condition block   |
| <code>assumption</code> | Proof Assumption block |

## **ignore\_descendants**

Boolean value that specifies to ignore the coverage of descendant objects if set to 1.

# getCoverageInfo

---

## Output Arguments

### coverage

Two-element vector of the form `[covered_outcomes total_outcomes]`.

|                               |                                                             |
|-------------------------------|-------------------------------------------------------------|
| <code>covered_outcomes</code> | Number of test objectives satisfied for <code>object</code> |
| <code>total_outcomes</code>   | Total number of test objectives for <code>object</code>     |

`coverage` is empty if `cvdo` does not contain decision coverage results for `object`.

### description

Structure array containing descriptions of each test objective, and descriptions and execution counts for each outcome within `object`.

## Examples

Collect and display coverage data for the Test Objective block named True in the `sldvdemo_debounce_testobjblks` model:

```
mdl = 'sldvdemo_debounce_testobjblks';  
open_system(mdl)  
testObj = cvtest(mdl)  
testObj.settings.designverifier = 1;  
data = cvsims(testObj)  
blk_handle = get_param([mdl, '/True'], 'Handle');  
getCoverageInfo(data, blk_handle)
```

## Alternatives

Use the Coverage Settings dialog box to collect and display coverage results for Simulink Design Verifier library blocks:

- 1 Open the model.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** tab, select **Coverage for this model**.
- 4 Under **Coverage metrics**, select **Simulink Design Verifier**.

- 5 Click **OK** to close the Coverage Settings dialog box and save your changes.
- 6 Simulate the model and review the results.

## See Also

[complexityinfo](#) | [conditioninfo](#) | [cvsim](#) | [decisioninfo](#) | [mcdcinfo](#) | [overflowsaturationinfo](#) | [sigrangeinfo](#) | [sigsizeinfo](#) | [tableinfo](#)

## How To

- “Simulink Design Verifier Coverage”

# ModelAdvisor.Table.getEntry

---

|                         |                                                                                                                                                                            |                                                                             |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>Purpose</b>          | Get table cell contents                                                                                                                                                    |                                                                             |
| <b>Syntax</b>           | <code>content = getEntry(table, row, column)</code>                                                                                                                        |                                                                             |
| <b>Description</b>      | <code>content = getEntry(table, row, column)</code> gets the contents of the specified cell.                                                                               |                                                                             |
| <b>Input Arguments</b>  | <code>table</code>                                                                                                                                                         | Instantiation of the <code>ModelAdvisor.Table</code> class                  |
|                         | <code>row</code>                                                                                                                                                           | An integer specifying the row                                               |
|                         | <code>column</code>                                                                                                                                                        | An integer specifying the column                                            |
| <b>Output Arguments</b> | <code>content</code>                                                                                                                                                       | An element object or object array specifying the content of the table entry |
| <b>Examples</b>         | Get the content of the table cell in the third column, third row:<br><pre>table1 = ModelAdvisor.Table(4, 4);<br/>.<br/>.<br/>.<br/>content = getEntry(table1, 3, 3);</pre> |                                                                             |
| <b>See Also</b>         | “Model Advisor Customization”                                                                                                                                              |                                                                             |
| <b>How To</b>           | • “Authoring Checks”                                                                                                                                                       |                                                                             |

**Purpose**

Return check identifier

**Syntax**

```
id = getID(check_obj)
```

**Description**

`id = getID(check_obj)` returns the ID of the check `check_obj`. `id` is a unique string that identifies the check.

You create this unique identifier when you create the check. This unique identifier is the equivalent of the `ModelAdvisor.Check ID` property.

**See Also**

“Model Advisor Customization”

**How To**

- “Define Custom Checks”
- “Authoring Checks”

# mcdcinfo

---

**Purpose** Retrieve modified condition/decision coverage information from cvdata object

**Syntax**

```
coverage = mcdcinfo(cvdo, object)
coverage = mcdcinfo(cvdo, object, ignore_descendants)
[coverage, description] = mcdcinfo(cvdo, object)
```

**Description** coverage = mcdcinfo(cvdo, object) returns modified condition/decision coverage (MCDC) results from the cvdata object cvdo for the model component specified by object.

coverage = mcdcinfo(cvdo, object, ignore\_descendants) returns MCDC results for object, depending on the value of ignore\_descendants.

[coverage, description] = mcdcinfo(cvdo, object) returns MCDC results and text descriptions of each condition/decision in object.

## Input Arguments

**cvdo**  
cvdata object

### ignore\_descendants

Logical value specifying whether to ignore the coverage of descendant objects

- 1 — Ignore coverage of descendant objects
- 0 — Collect coverage for descendant objects

### object

The **object** argument specifies an object in the Simulink model or Stateflow diagram that receives decision coverage. Valid values for **object** include the following:



| Object Specification | Description                                                                                                                            |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| BlockPath            | Full path to a model or block                                                                                                          |
| BlockHandle          | Handle to a model or block                                                                                                             |
| s1Obj                | Handle to a Simulink API object                                                                                                        |
| sfID                 | Stateflow ID                                                                                                                           |
| sfObj                | Handle to a Stateflow API object                                                                                                       |
| {BlockPath, sfID}    | Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart           |
| {BlockPath, sfObj}   | Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart |
| [BlockHandle, sfID]  | Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart                |

## Output Arguments

### coverage

Two-element vector of the form [*covered\_outcomes* *total\_outcomes*]. *coverage* is empty if *cvdo* does not contain modified condition/decision coverage results for *object*. The two elements are:

|                         |                                                                   |
|-------------------------|-------------------------------------------------------------------|
| <i>covered_outcomes</i> | Number of condition/decision outcomes satisfied for <i>object</i> |
| <i>total_outcomes</i>   | Total number of condition/decision outcomes for <i>object</i>     |

### description

A structure array containing the following fields:

|                                  |                                                                                                          |
|----------------------------------|----------------------------------------------------------------------------------------------------------|
| <code>text</code>                | String denoting whether the condition/decision is associated with a block output or Stateflow transition |
| <code>condition.text</code>      | String describing a condition/decision or the block port to which it applies                             |
| <code>condition.achieved</code>  | Logical array indicating whether a condition case has been fully covered                                 |
| <code>condition.trueRslt</code>  | String representing a condition case expression that produces a true result                              |
| <code>condition.falseRslt</code> | String representing a condition case expression that produces a false result                             |

## Examples

Collect MCDC coverage for the `slvndemo_cv_small_controller` model and determine the percentage of MCDC coverage collected for the Logic block in the Gain subsystem:

```
mdl = 'slvndemo_cv_small_controller';
open_system(mdl)
%Create test specification object
testObj = cvtest(mdl)
%Enable MCDC coverage
testObj.settings.mcdc = 1;
%Simulate model
data = cvsim(testObj)
%Retrieve MCDC results for Logic block
blk_handle = get_param([mdl, '/Gain/Logic'], 'Handle');
cov = mcdcinfo(data, blk_handle)
%Percentage of MCDC outcomes covered
```

---

```
percent_cov = 100 * cov(1) / cov(2)
```

## Alternatives

Use the Coverage Settings dialog box to collect MCDC coverage for a model:

- 1** Open the model.
- 2** In the Model Editor, select **Analysis > Coverage > Settings**.
- 3** On the **Coverage** tab, select **Coverage for this model**.
- 4** Under **Coverage metrics**, select **MCDC**.
- 5** On the **Results** and **Reporting** tabs, specify the output you need.
- 6** Click **OK** to close the Coverage Settings dialog box and save your changes.
- 7** Simulate the model and review the MCDC coverage results.

## See Also

[complexityinfo](#) | [conditioninfo](#) | [cvsim](#) | [decisioninfo](#) | [getCoverageInfo](#) | [overflowsaturationinfo](#) | [sigrangeinfo](#) | [sigsizeinfo](#) | [tableinfo](#)

## How To

- “Modified Condition/Decision Coverage (MDCD)”
- “MCDC Analysis”

# ModelAdvisor.Action

---

|                       |                                                                                                                                                                                                       |                                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Purpose</b>        | Add actions to custom checks                                                                                                                                                                          |                                  |
| <b>Description</b>    | Instances of this class define actions you take when the Model Advisor checks do not pass. Users access actions by clicking the <b>Action</b> button that you define in the Model Advisor window.     |                                  |
| <b>Construction</b>   | ModelAdvisor.Action                                                                                                                                                                                   | Add actions to custom checks     |
| <b>Methods</b>        | setCallbackFcn                                                                                                                                                                                        | Specify action callback function |
| <b>Properties</b>     | Description                                                                                                                                                                                           | Message in <b>Action</b> box     |
|                       | Name                                                                                                                                                                                                  | Action button label              |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.                                                                    |                                  |
| <b>Examples</b>       | <pre>% define action (fix) operation myAction = ModelAdvisor.Action; myAction.Name='Fix block fonts'; myAction.Description=...     'Click the button to update all blocks with specified font';</pre> |                                  |
| <b>See Also</b>       | “Model Advisor Customization”                                                                                                                                                                         |                                  |
| <b>How To</b>         | • “Authoring Checks”                                                                                                                                                                                  |                                  |

**Purpose**

Add actions to custom checks

**Syntax**

```
action_obj = ModelAdvisor.Action
```

**Description**

`action_obj = ModelAdvisor.Action` creates a handle to an action object.

---

**Note**

- Include an action definition in a check definition.
  - Each check can contain only one action.
- 

**Examples**

```
% define action (fix) operation  
myAction = ModelAdvisor.Action;
```

**See Also**

“Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Check

---

**Purpose** Create custom checks

**Description** The `ModelAdvisor.Check` class creates a Model Advisor check object. Checks must have an associated `ModelAdvisor.Task` object to be displayed in the Model Advisor tree.

You can use one `ModelAdvisor.Check` object in multiple `ModelAdvisor.Task` objects, allowing you to place the same check in multiple locations in the Model Advisor tree. For example, **Check for implicit signal resolution** is displayed in the **By Product > Simulink** folder and in the **By Task > Model Referencing** folder in the Model Advisor tree.

When you use checks in task definitions, the following rules apply:

- If you define the properties of the check in the check definition and the task definition, the task definition takes precedence. The Model Advisor displays the information contained in the task definition. For example, if you define the name of the check in the task definition using the `ModelAdvisor.Task.DisplayName` property and in the check definition using the `ModelAdvisor.Check.Title` property, the Model Advisor displays the information provided in `ModelAdvisor.Task.DisplayName`.
- If you define the properties of the check in the check definition but not the task definition, the task uses the properties from the check. For example, if you define the name of the check in the check definition using the `ModelAdvisor.Check.Title` property, and you register the check using a task definition, the Model Advisor displays the information provided in `ModelAdvisor.Check.Title`.
- If you define the properties of the check in the task definition but not the check definition, the Model Advisor displays the information as long as you register the task with the Model Advisor instead of the check. For example, if you define the name of the check in the task definition using the `ModelAdvisor.Task.DisplayName` property instead of the `ModelAdvisor.Check.Title` property, and you register the check using a task definition, the Model Advisor displays the information provided in `ModelAdvisor.Task.DisplayName`.

|                     |                              |                                                            |
|---------------------|------------------------------|------------------------------------------------------------|
| <b>Construction</b> | ModelAdvisor.Check           | Create custom checks                                       |
| <b>Methods</b>      | getID                        | Return check identifier                                    |
|                     | setAction                    | Specify action for check                                   |
|                     | setCallbackFcn               | Specify callback function for check                        |
|                     | setInputParameters           | Specify input parameters for check                         |
|                     | setInputParametersLayoutGrid | Specify layout grid for input parameters                   |
| <b>Properties</b>   | CallbackContext              | Specify when to run check                                  |
|                     | CallbackHandle               | Callback function handle for check                         |
|                     | CallbackStyle                | Callback function type                                     |
|                     | EmitInputParametersToReport  | Display check input parameters in the Model Advisor report |
|                     | Enable                       | Indicate whether user can enable or disable check          |
|                     | ID                           | Identifier for check                                       |
|                     | LicenseName                  | Product license names required to display and run check    |
|                     | ListViewVisible              | Status of button                                           |
|                     | Result                       | Results cell array                                         |
|                     | supportExclusion             | Set to support exclusions                                  |
|                     | SupportLibrary               | Set to support library models                              |

# ModelAdvisor.Check

---

|           |                                   |
|-----------|-----------------------------------|
| Title     | Name of check                     |
| TitleTips | Description of check              |
| Value     | Status of check                   |
| Visible   | Indicate to display or hide check |

## **Copy Semantics**

Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.

## **Examples**

```
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');
```

## **See Also**

“Model Advisor Customization”

## **How To**

- “Authoring Checks”



**Purpose** Create custom checks

**Syntax** `check_obj = ModelAdvisor.Check(check_ID)`

**Description** `check_obj = ModelAdvisor.Check(check_ID)` creates a check object, `check_obj`, and assigns it a unique identifier, `check_ID`. `check_ID` must remain constant. To display checks in the Model Advisor tree, checks must have an associated `ModelAdvisor.Task` or `ModelAdvisor.Root` object.

---

**Note** You can use one `ModelAdvisor.Check` object in multiple `ModelAdvisor.Task` objects, allowing you to place the same check in multiple locations in the Model Advisor tree. For example, **Check for implicit signal resolution appears** in the **By Product > Simulink folder** and in the **By Task > Model Referencing** folder in the Model Advisor tree.

---

**Examples** `rec = ModelAdvisor.Check('com.mathworks.sample.Check1');`

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.FactoryGroup

---

|                       |                                                                                                                                                     |                                           |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Purpose</b>        | Define subfolder in <b>By Task</b> folder                                                                                                           |                                           |
| <b>Description</b>    | The <code>ModelAdvisor.FactoryGroup</code> class defines a new subfolder to add to the <b>By Task</b> folder.                                       |                                           |
| <b>Construction</b>   | <code>ModelAdvisor.FactoryGroup</code>                                                                                                              | Define subfolder in <b>By Task</b> folder |
| <b>Methods</b>        | <code>addCheck</code>                                                                                                                               | Add check to folder                       |
| <b>Properties</b>     | Description                                                                                                                                         | Description of folder                     |
|                       | <code>DisplayName</code>                                                                                                                            | Name of folder                            |
|                       | <code>ID</code>                                                                                                                                     | Identifier for folder                     |
|                       | <code>MAObj</code>                                                                                                                                  | Model Advisor object                      |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see <a href="#">Copying Objects in the MATLAB Programming Fundamentals documentation</a> . |                                           |
| <b>Examples</b>       | <pre>% --- sample factory group rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');</pre>                                         |                                           |
| <b>See Also</b>       | “Model Advisor Customization”                                                                                                                       |                                           |
| <b>How To</b>         | • “Authoring Checks”                                                                                                                                |                                           |

|                    |                                                                                                                                                                                                                            |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Define subfolder in <b>By Task</b> folder                                                                                                                                                                                  |
| <b>Syntax</b>      | <code>fg_obj = ModelAdvisor.FactoryGroup(fg_ID)</code>                                                                                                                                                                     |
| <b>Description</b> | <code>fg_obj = ModelAdvisor.FactoryGroup(fg_ID)</code> creates a handle to a factory group object, <code>fg_obj</code> , and assigns it a unique identifier, <code>fg_ID</code> . <code>fg_ID</code> must remain constant. |
| <b>Examples</b>    | <pre>% --- sample factory group rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');</pre>                                                                                                                |
| <b>See Also</b>    | “Model Advisor Customization”                                                                                                                                                                                              |
| <b>How To</b>      | <ul style="list-style-type: none"><li>• “Authoring Checks”</li></ul>                                                                                                                                                       |

# ModelAdvisor.FormatTemplate

---

**Purpose**            Template for formatting Model Advisor analysis results

**Description**        Use the `ModelAdvisor.FormatTemplate` class to format the result of a check in the analysis result pane of the Model Advisor for a uniform look and feel among the checks you create. There are two formats for the analysis result:

- Table
- List

**Construction**        `ModelAdvisor.FormatTemplate`        Construct template object for formatting Model Advisor analysis results

**Methods**

|                                     |                                         |
|-------------------------------------|-----------------------------------------|
| <code>addRow</code>                 | Add row to table                        |
| <code>setCheckText</code>           | Add description of check to result      |
| <code>setColTitles</code>           | Add column titles to table              |
| <code>setInformation</code>         | Add description of subcheck to result   |
| <code>setListObj</code>             | Add list of hyperlinks to model objects |
| <code>setRecAction</code>           | Add Recommended Action section and text |
| <code>setRefLink</code>             | Add See Also section and links          |
| <code>setSubBar</code>              | Add line between subcheck results       |
| <code>setSubResultStatus</code>     | Add status to check or subcheck result  |
| <code>setSubResultStatusText</code> | Add text below status in result         |

|               |                                  |
|---------------|----------------------------------|
| setSubTitle   | Add title for subcheck in result |
| setTableInfo  | Add data to table                |
| setTableTitle | Add title to table               |

## Copy Semantics

Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.

## Examples

The following code creates two template objects, `ft1` and `ft2`, and uses them to format the result of running the check in a table and a list. The result identifies the blocks in the model. The graphics following the code display the output as it appears in the Model Advisor when the check passes and fails.

```
% Sample Check With Subchecks Callback Function
function ResultDescription = SampleStyleOneCallback(system)
mdladvObj = Simulink.ModelAdvisor.getModelAdvisor(system); % get object

%Initialize variables
ResultDescription={};
ResultStatus = false; % Default check status is 'Warning'
mdladvObj.setCheckResultStatus(ResultStatus);

% Create FormatTemplate object for first subcheck, specify table format
ft1 = ModelAdvisor.FormatTemplate('TableTemplate');

% Add information describing the overall check
setCheckText(ft1, ['Find and report all blocks in the model. '...
    '(setCheckText method - Description of what the check reviews)']);

% Add information describing the subcheck
setSubTitle(ft1, 'Table of Blocks (setSubTitle method - Title of the subcheck)');
setInformation(ft1, ['Find and report all blocks in a table. '...
    '(setInformation method - Description of what the subcheck reviews)']);

% Add See Also section for references to standards
```

# ModelAdvisor.FormatTemplate

---

```
setRefLink(ft1, {'Standard 1 reference (setRefLink method)',
               {'Standard 2 reference (setRefLink method)'});

% Add information to the table
setTableTitle(ft1, {'Blocks in the Model (setTableTitle method)'});
setColTitles(ft1, {'Index (setColTitles method)',
                  'Block Name (setColTitles method)'});

% Perform the check actions
allBlocks = find_system(system);
if length(find_system(system)) == 1
    % Add status for subcheck
    setSubResultStatus(ft1, 'Warn');
    setSubResultStatusText(ft1, ['The model does not contain blocks. '...
                               '(setSubResultStatusText method - Description of result status)']);
    setRecAction(ft1, {'Add blocks to the model. '...
                     '(setRecAction method - Description of how to fix the problem)'});
    ResultStatus = false;
else
    % Add status for subcheck
    setSubResultStatus(ft1, 'Pass');
    setSubResultStatusText(ft1, ['The model contains blocks. '...
                               '(setSubResultStatusText method - Description of result status)']);
    for inx = 2 : length(allBlocks)
        % Add information to the table
        addRow(ft1, {inx-1,allBlocks(inx)});
    end
    ResultStatus = true;
end

% Pass table template object for subcheck to Model Advisor
ResultDescription{end+1} = ft1;

% Create FormatTemplate object for second subcheck, specify list format
ft2 = ModelAdvisor.FormatTemplate('ListTemplate');

% Add information describing the subcheck
```

```
setSubTitle(ft2, 'List of Blocks (setSubTitle method - Title of the subcheck)');
setInformation(ft2, ['Find and report all blocks in a list. '...
    '(setInformation method - Description of what the subcheck reviews)']);

% Add See Also section for references to standards
setRefLink(ft2, {'Standard 1 reference (setRefLink method)',
    'Standard 2 reference (setRefLink method)'});


% Last subcheck, suppress line
setSubBar(ft2, false);

% Perform the subcheck actions
if length(find_system(system)) == 1
    % Add status for subcheck
    setSubResultStatus(ft2, 'Warn');
    setSubResultStatusText(ft2, ['The model does not contain blocks. '...
        '(setSubResultStatusText method - Description of result status)']);
    setRecAction(ft2, {'Add blocks to the model. '...
        '(setRecAction method - Description of how to fix the problem)'});
    ResultStatus = false;
else
    % Add status for subcheck
    setSubResultStatus(ft2, 'Pass');
    setSubResultStatusText(ft2, ['The model contains blocks. '...
        '(setSubResultStatusText method - Description of result status)']);
    % Add information to the list
    setListObj(ft2, allBlocks);
end

% Pass list template object for the subcheck to Model Advisor
ResultDescription{end+1} = ft2;
% Set overall check status
mdladvObj.setCheckResultStatus(ResultStatus);
```

# ModelAdvisor.FormatTemplate

The following graphic displays the output as it appears in the Model Advisor when the check passes.

Result:  Passed

Find and report all blocks in the model. (setCheckText method - Description of what the check reviews)

**Table of Blocks (setSubTitle method - Title of the subcheck)**  
Find and report all blocks in a table. (setInformation method - Description of what the subcheck reviews)

**See Also**

- Standard 1 reference (setRefLink method)
- Standard 2 reference (setRefLink method)

**Passed**  
The model contains blocks. (setSubResultStatusText method - Description of result status)

Blocks in the Model (setTableTitle method)

| Index (setColTitles method) | Block Name (setColTitles method)               |
|-----------------------------|------------------------------------------------|
| 1                           | <a href="#">format template test/Constant</a>  |
| 2                           | <a href="#">format template test/Constant1</a> |
| 3                           | <a href="#">format template test/Gain</a>      |
| 4                           | <a href="#">format template test/Product</a>   |
| 5                           | <a href="#">format template test/Out1</a>      |

---

**List of Blocks (setSubTitle method - Title of the subcheck)**  
Find and report all blocks in a list. (setInformation method - Description of what the subcheck reviews)

**See Also**


- Standard 1 reference (setRefLink method)
- Standard 2 reference (setRefLink method)

**Passed**  
The model contains blocks. (setSubResultStatusText method - Description of result status)

- [format template test](#)
- [format template test/Constant](#)
- [format template test/Constant1](#)
- [format template test/Gain](#)
- [format template test/Product](#)
- [format template test/Out1](#)



The following graphic displays the output as it appears in the Model Advisor when the check fails.

Result:  Warning

Find and report all blocks in the model. (setCheckText method - Description of what the check reviews)

**Table of Blocks (setSubTitle method - Title of the subcheck)**  
Find and report all blocks in a table. (setInformation method - Description of what the subcheck reviews)

**See Also**

- Standard 1 reference (setRefLink method)
- Standard 2 reference (setRefLink method)

**Warning**  
The model does not contain blocks. (setSubResultStatusText method - Description of result status)

**Recommended Action**  
Add blocks to the model.  
(setRecAction method - Description of how to fix the problem)

---

**List of Blocks (setSubTitle method - Title of the subcheck)**  
Find and report all blocks in a list. (setInformation method - Description of what the subcheck reviews)

**See Also**

- Standard 1 reference (setRefLink method)
- Standard 2 reference (setRefLink method)

**Warning**  
The model does not contain blocks. (setSubResultStatusText method - Description of result status)

**Recommended Action**  
Add blocks to the model.  
(setRecAction method - Description of how to fix the problem)

# ModelAdvisor.FormatTemplate

---

**Alternatives** Use the Model Advisor Formatting API to format check analysis results. However, use the `ModelAdvisor.FormatTemplate` class for a uniform look and feel among the checks you create.

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”
- “Format Model Advisor Results”

**Purpose** Construct template object for formatting Model Advisor analysis results

**Syntax** `obj = ModelAdvisor.FormatTemplate('type')`

**Description** `obj = ModelAdvisor.FormatTemplate('type')` creates a handle, *obj*, to an object of the `ModelAdvisor.FormatTemplate` class. *type* is a string identifying the format type of the template, either list or table. Valid values are `ListTemplate` and `TableTemplate`.

You must return the result object to the Model Advisor to display the formatted result in the analysis result pane.

---

**Note** Use the `ModelAdvisor.FormatTemplate` class in check callbacks.

---

**Examples** Create a template object, `ft`, and use it to create a list template:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”
- “Format Model Advisor Results”

# ModelAdvisor.Group

---

|                                 |                                                                                                                                                                                                                                                                |                                 |                         |                           |                         |                      |                       |                    |                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------|---------------------------|-------------------------|----------------------|-----------------------|--------------------|----------------------|
| <b>Purpose</b>                  | Define custom folder                                                                                                                                                                                                                                           |                                 |                         |                           |                         |                      |                       |                    |                      |
| <b>Description</b>              | The <code>ModelAdvisor.Group</code> class defines a folder that is displayed in the Model Advisor tree. Use folders to consolidate checks by functionality or usage.                                                                                           |                                 |                         |                           |                         |                      |                       |                    |                      |
| <b>Construction</b>             | <table><tr><td><code>ModelAdvisor.Group</code></td><td>Define custom folder</td></tr></table>                                                                                                                                                                  | <code>ModelAdvisor.Group</code> | Define custom folder    |                           |                         |                      |                       |                    |                      |
| <code>ModelAdvisor.Group</code> | Define custom folder                                                                                                                                                                                                                                           |                                 |                         |                           |                         |                      |                       |                    |                      |
| <b>Methods</b>                  | <table><tr><td><code>addGroup</code></td><td>Add subfolder to folder</td></tr><tr><td><code>addProcedure</code></td><td>Add procedure to folder</td></tr><tr><td><code>addTask</code></td><td>Add task to folder</td></tr></table>                             | <code>addGroup</code>           | Add subfolder to folder | <code>addProcedure</code> | Add procedure to folder | <code>addTask</code> | Add task to folder    |                    |                      |
| <code>addGroup</code>           | Add subfolder to folder                                                                                                                                                                                                                                        |                                 |                         |                           |                         |                      |                       |                    |                      |
| <code>addProcedure</code>       | Add procedure to folder                                                                                                                                                                                                                                        |                                 |                         |                           |                         |                      |                       |                    |                      |
| <code>addTask</code>            | Add task to folder                                                                                                                                                                                                                                             |                                 |                         |                           |                         |                      |                       |                    |                      |
| <b>Properties</b>               | <table><tr><td>Description</td><td>Description of folder</td></tr><tr><td><code>DisplayName</code></td><td>Name of folder</td></tr><tr><td>ID</td><td>Identifier for folder</td></tr><tr><td><code>MAObj</code></td><td>Model Advisor object</td></tr></table> | Description                     | Description of folder   | <code>DisplayName</code>  | Name of folder          | ID                   | Identifier for folder | <code>MAObj</code> | Model Advisor object |
| Description                     | Description of folder                                                                                                                                                                                                                                          |                                 |                         |                           |                         |                      |                       |                    |                      |
| <code>DisplayName</code>        | Name of folder                                                                                                                                                                                                                                                 |                                 |                         |                           |                         |                      |                       |                    |                      |
| ID                              | Identifier for folder                                                                                                                                                                                                                                          |                                 |                         |                           |                         |                      |                       |                    |                      |
| <code>MAObj</code>              | Model Advisor object                                                                                                                                                                                                                                           |                                 |                         |                           |                         |                      |                       |                    |                      |
| <b>Copy Semantics</b>           | Handle. To learn how this affects your use of the class, see <a href="#">Copying Objects in the MATLAB Programming Fundamentals documentation</a> .                                                                                                            |                                 |                         |                           |                         |                      |                       |                    |                      |
| <b>See Also</b>                 | “Model Advisor Customization”                                                                                                                                                                                                                                  |                                 |                         |                           |                         |                      |                       |                    |                      |
| <b>How To</b>                   | <ul style="list-style-type: none"><li>• “Authoring Checks”</li></ul>                                                                                                                                                                                           |                                 |                         |                           |                         |                      |                       |                    |                      |

**Purpose**

Define custom folder

**Syntax**

```
group_obj = ModelAdvisor.Group(group_ID)
```

**Description**

`group_obj = ModelAdvisor.Group(group_ID)` creates a handle to a group object, `group_obj`, and assigns it a unique identifier, `group_ID`. `group_ID` must remain constant.

**Examples**

```
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');
```

**See Also**

“Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Image

---

|                       |                                                                                                                                    |                                       |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Purpose</b>        | Include image in Model Advisor output                                                                                              |                                       |
| <b>Description</b>    | The <code>ModelAdvisor.Image</code> class adds an image to the Model Advisor output.                                               |                                       |
| <b>Construction</b>   | <code>ModelAdvisor.Image</code>                                                                                                    | Include image in Model Advisor output |
| <b>Methods</b>        | <code>setHyperlink</code>                                                                                                          | Specify hyperlink location            |
|                       | <code>setImageSource</code>                                                                                                        | Specify image location                |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation. |                                       |
| <b>See Also</b>       | “Model Advisor Customization”                                                                                                      |                                       |
| <b>How To</b>         | <ul style="list-style-type: none"><li>• “Authoring Checks”</li><li>• “Format Model Advisor Results”</li></ul>                      |                                       |

|                    |                                                                                                                                                                                                                                        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Include image in Model Advisor output                                                                                                                                                                                                  |
| <b>Syntax</b>      | <code>object = ModelAdvisor.Image</code>                                                                                                                                                                                               |
| <b>Description</b> | <code>object = ModelAdvisor.Image</code> creates a handle to an image object, object, that the Model Advisor displays in the output. The Model Advisor supports many image formats, including, but not limited to, JPEG, BMP, and GIF. |
| <b>Examples</b>    | <code>image_obj = ModelAdvisor.Image;</code>                                                                                                                                                                                           |
| <b>See Also</b>    | “Model Advisor Customization”                                                                                                                                                                                                          |
| <b>How To</b>      | <ul style="list-style-type: none"><li>• “Authoring Checks”</li><li>• “Format Model Advisor Results”</li></ul>                                                                                                                          |

# ModelAdvisor.InputParameter

---

|                       |                                                                                                                                                                                               |                                               |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>Purpose</b>        | Add input parameters to custom checks                                                                                                                                                         |                                               |
| <b>Description</b>    | Instances of the <code>ModelAdvisor.InputParameter</code> class specify the input parameters a custom check uses in analyzing the model. Access input parameters in the Model Advisor window. |                                               |
| <b>Construction</b>   | <code>ModelAdvisor.InputParameter</code>                                                                                                                                                      | Add input parameters to custom checks         |
| <b>Methods</b>        | <code>setColSpan</code>                                                                                                                                                                       | Specify number of columns for input parameter |
|                       | <code>setRowSpan</code>                                                                                                                                                                       | Specify rows for input parameter              |
| <b>Properties</b>     | Description                                                                                                                                                                                   | Description of input parameter                |
|                       | Entries                                                                                                                                                                                       | Drop-down list entries                        |
|                       | Name                                                                                                                                                                                          | Input parameter name                          |
|                       | Type                                                                                                                                                                                          | Input parameter type                          |
|                       | Value                                                                                                                                                                                         | Value of input parameter                      |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see <a href="#">Copying Objects in the MATLAB Programming Fundamentals documentation</a> .                                           |                                               |
| <b>See Also</b>       | “Model Advisor Customization”                                                                                                                                                                 |                                               |
| <b>How To</b>         | • “Authoring Checks”                                                                                                                                                                          |                                               |



**Purpose** Add input parameters to custom checks

**Syntax** `input_param = ModelAdvisor.InputParameter`

**Description** `input_param = ModelAdvisor.InputParameter` creates a handle to an input parameter object, `input_param`.

---

**Note** You must include input parameter definitions in a check definition.

---

## Examples

---

**Note** The following example is a fragment of code from the `sl_customization.m` file for the example model, `slvndemo_mdladv`. The example does not execute as shown without the additional content found in the `sl_customization.m` file.

---

# ModelAdvisor.InputParameter

---

```
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');
rec.setInputParametersLayoutGrid([3 2]);
% define input parameters
inputParam1 = ModelAdvisor.InputParameter;
inputParam1.Name = 'Skip font checks.';
inputParam1.Type = 'Bool';
inputParam1.Value = false;
inputParam1.Description = 'sample tooltip';
inputParam1.setRowSpan([1 1]);
inputParam1.setColSpan([1 1]);
inputParam2 = ModelAdvisor.InputParameter;
inputParam2.Name = 'Standard font size';
inputParam2.Value='12';
inputParam2.Type='String';
inputParam2.Description='sample tooltip';
inputParam2.setRowSpan([2 2]);
inputParam2.setColSpan([1 1]);
inputParam3 = ModelAdvisor.InputParameter;
inputParam3.Name='Valid font';
inputParam3.Type='Combobox';
inputParam3.Description='sample tooltip';
inputParam3.Entries={'Arial', 'Arial Black'};
inputParam3.setRowSpan([2 2]);
inputParam3.setColSpan([2 2]);
rec.setInputParameters({inputParam1,inputParam2,inputParam3});
```

## See Also

“Model Advisor Customization”

## How To

- “Authoring Checks”

|                       |                                                                                                                                    |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>        | Insert line break                                                                                                                  |
| <b>Description</b>    | Use instances of the <code>ModelAdvisor.LineBreak</code> class to insert line breaks in the Model Advisor outputs.                 |
| <b>Construction</b>   | <code>ModelAdvisor.LineBreak</code> Insert line break                                                                              |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation. |
| <b>See Also</b>       | “Model Advisor Customization”                                                                                                      |
| <b>How To</b>         | <ul style="list-style-type: none"><li>• “Authoring Checks”</li><li>• “Format Model Advisor Results”</li></ul>                      |

# ModelAdvisor.LineBreak

---

|                    |                                                                                                                                                                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Insert line break                                                                                                                                                     |
| <b>Syntax</b>      | <code>ModelAdvisor.LineBreak</code>                                                                                                                                   |
| <b>Description</b> | <code>ModelAdvisor.LineBreak</code> inserts a line break into the Model Advisor output.                                                                               |
| <b>Examples</b>    | <p>Add a line break between two lines of text:</p> <pre>result = ModelAdvisor.Paragraph;<br/>addItem(result, [resultText1 ModelAdvisor.LineBreak resultText2]);</pre> |
| <b>See Also</b>    | “Model Advisor Customization”                                                                                                                                         |
| <b>How To</b>      | <ul style="list-style-type: none"><li>• “Authoring Checks”</li><li>• “Format Model Advisor Results”</li></ul>                                                         |

|                       |                                                                                                                                    |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>        | Create list class                                                                                                                  |
| <b>Description</b>    | Use instances of the <code>ModelAdvisor.List</code> class to create list-formatted outputs.                                        |
| <b>Construction</b>   | <code>ModelAdvisor.List</code> Create list class                                                                                   |
| <b>Methods</b>        | <code>addItem</code> Add item to list<br><code>setType</code> Specify list type                                                    |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation. |
| <b>See Also</b>       | “Model Advisor Customization”                                                                                                      |
| <b>How To</b>         | <ul style="list-style-type: none"><li>• “Authoring Checks”</li><li>• “Format Model Advisor Results”</li></ul>                      |

# ModelAdvisor.List

---

**Purpose** Create list class

**Syntax** `list = ModelAdvisor.List`

**Description** `list = ModelAdvisor.List` creates a list object, `list`.

**Examples**

```
subList = ModelAdvisor.List();
setType(subList, 'numbered')
addItem(subList, ModelAdvisor.Text('Sub entry 1', {'pass', 'bold'}));
addItem(subList, ModelAdvisor.Text('Sub entry 2', {'pass', 'bold'}));
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”
- “Format Model Advisor Results”

# ModelAdvisor.ListViewParameter

---

|                       |                                                                                                                                                                                                |                                                        |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Purpose</b>        | Add list view parameters to custom checks                                                                                                                                                      |                                                        |
| <b>Description</b>    | The Model Advisor uses list view parameters to populate the Model Advisor Result Explorer. Access the information in list views by clicking <b>Explore Result</b> in the Model Advisor window. |                                                        |
| <b>Construction</b>   | ModelAdvisor.ListViewParameter                                                                                                                                                                 | Add list view parameters to custom checks              |
| <b>Properties</b>     | Attributes                                                                                                                                                                                     | Attributes to display in Model Advisor Report Explorer |
|                       | Data                                                                                                                                                                                           | Objects in Model Advisor Result Explorer               |
|                       | Name                                                                                                                                                                                           | Drop-down list entry                                   |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.                                                             |                                                        |

## Examples

---

**Note** The following example is a fragment of code from the `sl_customization.m` file for the example model, `slvndemo_mdadv`. The example does not execute as shown without the additional content found in the `sl_customization.m` file.

---

```
mdladvObj = Simulink.ModelAdvisor.getModelAdvisor(system);
mdladvObj.setCheckResultStatus(true);

% define list view parameters
myLVParam = ModelAdvisor.ListViewParameter;
myLVParam.Name = 'Invalid font blocks'; % the name appeared at pull down filter
myLVParam.Data = get_param(searchResult,'object');
```

# ModelAdvisor.ListViewParameter

---

```
myLVParam.Attributes = {'FontName'}; % name is default property
mdladvObj.setListViewParameters({myLVParam});
```

## See Also

“Model Advisor Customization”

## How To

- “Authoring Checks”



**Purpose** Add list view parameters to custom checks

**Syntax** `lv_param = ModelAdvisor.ListViewParameter`

**Description** `lv_param = ModelAdvisor.ListViewParameter` defines a list view, `lv_param`.

---

**Note** Include list view parameter definitions in a check definition.

---

**See Also** “Model Advisor Customization”

**How To**

- “Define Model Advisor Result Explorer Views”
- “Authoring Checks”
- “Batch-Fix Warnings or Failures”
- “Customization Example”
- “getListViewParameters”
- “setListViewParameters”

# ModelAdvisor.lookupCheckID

---

|                         |                                                                                                                                                                                                                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>          | Look up Model Advisor check ID                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>           | <code>NewID = ModelAdvisor.lookupCheckID('OldCheckID')</code>                                                                                                                                                                                                                                                             |
| <b>Description</b>      | <code>NewID = ModelAdvisor.lookupCheckID('OldCheckID')</code> returns the check ID of the check specified by <code>OldCheckID</code> . <code>OldCheckID</code> is the ID of a check prior to R2010b.                                                                                                                      |
| <b>Input Arguments</b>  | <b>OldCheckID</b><br><code>OldCheckID</code> is the ID of a check prior to R2010b.                                                                                                                                                                                                                                        |
| <b>Output Arguments</b> | <b>NewID</b><br>Check ID that corresponds to the previous check ID identified by <code>OldCheckID</code> .                                                                                                                                                                                                                |
| <b>Examples</b>         | Look up the check ID for <b>By Product &gt; Simulink Verification and Validation &gt; Modeling Standards &gt; DO-178C/DO-331 Checks &gt; Check safety-related optimization settings</b> using the previous ID <code>D0178B:OptionSet</code> :<br><br><code>NewID = ModelAdvisor.lookupCheckID('D0178B:OptionSet');</code> |
| <b>Alternatives</b>     | “Archive and View Results”                                                                                                                                                                                                                                                                                                |
| <b>See Also</b>         | <code>ModelAdvisor.run</code>                                                                                                                                                                                                                                                                                             |
| <b>How To</b>           | • “Archive and View Results”                                                                                                                                                                                                                                                                                              |

|                       |                                                                                                                                                          |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>        | Create and format paragraph                                                                                                                              |
| <b>Description</b>    | The ModelAdvisor.Paragraph class creates and formats a paragraph object.                                                                                 |
| <b>Construction</b>   | ModelAdvisor.Paragraph      Create and format paragraph                                                                                                  |
| <b>Methods</b>        | addItem      Add item to paragraph<br>setAlign      Specify paragraph alignment                                                                          |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.                       |
| <b>Examples</b>       | <pre>% Check Simulation optimization setting ResultDescription{end+1} = ModelAdvisor.Paragraph(['Check Simulation '... 'optimization settings:']);</pre> |
| <b>See Also</b>       | “Model Advisor Customization”                                                                                                                            |
| <b>How To</b>         | <ul style="list-style-type: none"><li>• “Authoring Checks”</li><li>• “Format Model Advisor Results”</li></ul>                                            |

# ModelAdvisor.Paragraph

---

|                    |                                                                                                                                                          |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Create and format paragraph                                                                                                                              |
| <b>Syntax</b>      | <code>para_obj = ModelAdvisor.Paragraph</code>                                                                                                           |
| <b>Description</b> | <code>para_obj = ModelAdvisor.Paragraph</code> defines a paragraph object <code>para_obj</code> .                                                        |
| <b>Examples</b>    | <pre>% Check Simulation optimization setting ResultDescription{end+1} = ModelAdvisor.Paragraph(['Check Simulation '... 'optimization settings:']);</pre> |
| <b>See Also</b>    | “Model Advisor Customization”                                                                                                                            |
| <b>How To</b>      | <ul style="list-style-type: none"><li>• “Authoring Checks”</li></ul>                                                                                     |

**Purpose** Define custom procedures

**Description** The `ModelAdvisor.Procedure` class defines a procedure that is displayed in the Model Advisor tree. Use procedures to organize additional procedures or checks by functionality or usage.

**Construction** `ModelAdvisor.Procedure` Define custom procedures

## Properties

### Description

Provides information about the procedure. Details about the procedure are displayed in the right pane of the Model Advisor.

**Default:** ' ' (null string)

### Name

Specifies the name of the procedure that is displayed in the Model Advisor.

**Default:** ' ' (null string)

### ID

Specifies a permanent, unique identifier for the procedure.

---

### Note

- You must specify this field.
  - The value of ID must remain constant.
  - The Model Advisor generates an error if ID is not unique.
  - Procedure definitions must refer to other procedures by ID.
-

# ModelAdvisor.Procedure

---

## **MAObj**

Specifies a handle to the current Model Advisor object.

## **Methods**

|              |                               |
|--------------|-------------------------------|
| addProcedure | Add subprocedure to procedure |
| addTask      | Add task to procedure         |

## **Copy Semantics**

Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.

## **See Also**

“Model Advisor Customization”

## **How To**

- “Overview of Procedural-Based Model Advisor Configurations”
- “Create Procedures”
- “Create a Procedural-Based Configuration”
- “Authoring Checks”

|                    |                                                                                                                                                                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Define custom procedures                                                                                                                                                                                                                               |
| <b>Syntax</b>      | <code>procedure_obj = ModelAdvisor.Procedure(procedure_ID)</code>                                                                                                                                                                                      |
| <b>Description</b> | <code>procedure_obj = ModelAdvisor.Procedure(procedure_ID)</code> creates a handle to a procedure object, <code>procedure_obj</code> , and assigns it a unique identifier, <code>procedure_ID</code> . <code>procedure_ID</code> must remain constant. |
| <b>Examples</b>    | <code>MAP = ModelAdvisor.Procedure('com.mathworks.sample.ProcedureSample');</code>                                                                                                                                                                     |
| <b>See Also</b>    | “Model Advisor Customization”                                                                                                                                                                                                                          |
| <b>How To</b>      | <ul style="list-style-type: none"><li>• “Overview of Procedural-Based Model Advisor Configurations”</li><li>• “Create Procedures”</li><li>• “Create a Procedural-Based Configuration”</li><li>• “Authoring Checks”</li></ul>                           |

# ModelAdvisor.Root

---

|                       |                                                                                                                                    |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>        | Identify root node                                                                                                                 |
| <b>Description</b>    | The <code>ModelAdvisor.Root</code> class returns the root object.                                                                  |
| <b>Construction</b>   | <code>ModelAdvisor.Root</code> Identify root node                                                                                  |
| <b>Methods</b>        | <code>publish</code> Publish object in Model Advisor root<br><code>register</code> Register object in Model Advisor root           |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation. |
| <b>See Also</b>       | “Model Advisor Customization”                                                                                                      |
| <b>How To</b>         | • “Authoring Checks”                                                                                                               |



|                    |                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Identify root node                                                                                     |
| <b>Syntax</b>      | <code>root_obj = ModelAdvisor.Root</code>                                                              |
| <b>Description</b> | <code>root_obj = ModelAdvisor.Root</code> creates a handle to the root object, <code>root_obj</code> . |
| <b>Examples</b>    | <code>mdladvRoot = ModelAdvisor.Root;</code>                                                           |
| <b>See Also</b>    | “Model Advisor Customization”                                                                          |
| <b>How To</b>      | <ul style="list-style-type: none"><li>• “Authoring Checks”</li></ul>                                   |

# ModelAdvisor.run

---

## Purpose

Run Model Advisor checks on systems

## Syntax

```
SysResultObjArray =  
ModelAdvisor.run(SysList,CheckIDList,Name,Value)  
SysResultObjArray =  
ModelAdvisor.run(SysList,'Configuration',  
    FileName,Name,Value)
```

## Description

`SysResultObjArray = ModelAdvisor.run(SysList,CheckIDList,Name,Value)` runs the Model Advisor on the systems provided by `SysList` with additional options specified by one or more optional `Name,Value` pair arguments. `CheckIDList` contains cell array of check IDs to run.

`SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',FileName,Name,Value)` runs the Model Advisor on the systems provided by `SysList`. The list of checks to run is specified using a Model Advisor configuration file, specified by `FileName`.

## Tips

- If you have a Parallel Computing Toolbox™ license and a multicore machine, Model Advisor can run on multiple systems in parallel. You can run the Model Advisor in parallel mode by using `ModelAdvisor.run` with `'ParallelMode'` set to `'On'`. By default, `'ParallelMode'` is set to `'Off'`. When you use `ModelAdvisor.run` with `'ParallelMode'` set to `'On'`, MATLAB automatically creates a parallel pool.

## Input Arguments

### **SysList**

Cell array of systems to run.

### **CheckIDList**

Cell array of check IDs to run. For details on how to find check IDs, see “Finding Check IDs”.

`CheckIDList` optionally can include input parameters for specific checks using the following syntax: `{ 'CheckID', 'InputParam', { 'IP', 'IPV' } }`, where `IP` is the input parameter name and `IPV` is the corresponding input parameter value. You can specify several input parameter name and value pair arguments in any order as `IP1,IPV1, ,IPN,IPVN`.

## **FileName**

Name of the Model Advisor configuration file. For details on creating a configuration file, see “Organize Checks and Folders Using the Model Advisor Configuration Editor”.

## **Name-Value Pair Arguments**

Specify optional comma-separated pairs of `Name,Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside single quotes ( `' '` ). You can specify several name and value pair arguments in any order as `Name1,Value1, . . . ,NameN,ValueN`.

## **'DisplayResults'**

Setting `DisplayResults` to `'Summary'` displays a summary of the system results in the Command Window. Setting `DisplayResults` to `'Details'` displays the following in the Command Window:

- Which system the Model Advisor is checking while the run is in progress.
- For each system, the pass and fail results of each check.
- A summary of the system results.

Setting `DisplayResults` to `'None'` displays no information in the Command Window.

**Default:** `'Summary'`

## **'Force'**

# ModelAdvisor.run

---

Setting Force to 'On' removes existing `modeladvisor/system` folders. Setting Force to 'Off' prompts you before removing existing `modeladvisor/system` folders.

**Default:** 'Off'

## **'ParallelMode'**

Setting ParallelMode to 'On' runs the Model Advisor in parallel mode if you have a Parallel Computing Toolbox license and a multicore machine.

**Default:** 'Off'

## **'TempDir'**

Setting TempDir to 'On' runs the Model Advisor from a temporary working folder, to avoid concurrency issues when running using a parallel pool. For more information, see “Resolving Data Concurrency Issues”. Setting TempDir to 'Off' runs the Model Advisor in the current working folder.

**Default:** 'Off'

## **'ShowExclusions'**

Setting ShowExclusions to 'On' lists Model Advisor check exclusions in the report. Setting ShowExclusions to 'Off' does not list Model Advisor check exclusion in the report.

**Default:** 'On'

## **Output Arguments**

### **SysResultObjArray**

Cell array of `ModelAdvisor.SystemResult` objects, one for each model specified in `SysList`. Each `ModelAdvisor.SystemResult` object contains an array of `CheckResultObj` objects. Save `SysResultObjArray` to review results at a later time without having

to rerun the Model Advisor (see “Understanding the Save and Load Process”).

## CheckResultObj

Array of ModelAdvisor.CheckResult objects, one for each check that runs.

## Examples

Runs the Model Advisor checks **Check model diagnostic parameters** and **Check for fully defined interface** on the sldemo\_auto\_climatecontrol/Heater Control and sldemo\_auto\_climatecontrol/AC Control subsystems:

```
% Create list of checks and models to run.
CheckIDList = {'mathworks.maab.jc_0021',...
              'mathworks.iec61508.RootLevelInports'};
SysList={'sldemo_auto_climatecontrol/Heater Control',...
        'sldemo_auto_climatecontrol/AC Control'};

% Run the Model Advisor.
SysResultObjArray = ModelAdvisor.run(SysList,CheckIDList);
```

---

Runs the Model Advisor configuration file slvndemo\_mdadv\_config.mat on the sldemo\_auto\_climatecontrol/Heater Control and sldemo\_auto\_climatecontrol/AC Control subsystems:

```
% Identify Model Advisor configuration file.
% Create list of models to run.
fileName = 'slvndemo_mdadv_config.mat';
SysList={'sldemo_auto_climatecontrol/Heater Control',...
        'sldemo_auto_climatecontrol/AC Control'};

% Run the Model Advisor.
SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',fileName);
```

# ModelAdvisor.run

---

## Alternatives

- Use the Model Advisor GUI to run each system, one at a time.
- Create a script or function using the `Simulink.ModelAdvisor` class to run each system, one at a time.

## See Also

`ModelAdvisor.summaryReport` | `view` | `viewReport` |  
`ModelAdvisor.lookupCheckID`

## Tutorials

- “Workflow for Checking Systems Programmatically”
- “Check Multiple Systems in Parallel”
- “Create a Function for Checking Multiple Systems in Parallel”

## How To

- “Automating Check Execution”
- “Finding Check IDs”
- “Organize Checks and Folders Using the Model Advisor Configuration Editor”
- “Understanding the Save and Load Process”

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Open Model Advisor Command-Line Summary report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>          | <code>ModelAdvisor.summaryReport(SysResultObjArray)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>     | <code>ModelAdvisor.summaryReport(SysResultObjArray)</code> opens the Model Advisor Command-Line Summary report in a web browser. <code>SysResultObjArray</code> is a cell array of <code>ModelAdvisor.SystemResult</code> objects returned by <code>ModelAdvisor.run</code> .                                                                                                                                                                                                                                                                  |
| <b>Input Arguments</b> | <b>SysResultObjArray</b><br>Cell array of <code>ModelAdvisor.SystemResult</code> objects returned by <code>ModelAdvisor.run</code> .                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Examples</b>        | <p>Opens the Model Advisor Command-Line Summary report after running the Model Advisor:</p> <pre>% Identify Model Advisor configuration file. % Create list of models to run. fileName = 'slvndemo_mdladv_config.mat'; SysList={'sldemo_auto_climatecontrol/Heater Control',...         'sldemo_auto_climatecontrol/AC Control'};  % Run the Model Advisor. SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',fileName);  % Open the Model Advisor Command-Line Summary report. ModelAdvisor.summaryReport(SysResultObjArray)</pre> |
| <b>Alternatives</b>    | “View Results in Model Advisor Command-Line Summary Report”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>See Also</b>        | <code>ModelAdvisor.run</code>   <code>view</code>   <code>viewReport</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Tutorials</b>       | <ul style="list-style-type: none"><li>• “Workflow for Checking Systems Programmatically”</li><li>• “Check Multiple Systems in Parallel”</li><li>• “Create a Function for Checking Multiple Systems in Parallel”</li></ul>                                                                                                                                                                                                                                                                                                                      |

# ModelAdvisor.summaryReport

---

## **How To**

- “Automating Check Execution”
- “Archive and View Model Advisor Run Results”



**Purpose** Create table

**Description** Instances of the `ModelAdvisor.Table` class create and format a table. Specify the number of rows and columns in a table, excluding the table title and table heading row.

**Construction** `ModelAdvisor.Table` Create table

**Methods**

|                                  |                                            |
|----------------------------------|--------------------------------------------|
| <code>getEntry</code>            | Get table cell contents                    |
| <code>setColHeading</code>       | Specify table column title                 |
| <code>setColHeadingAlign</code>  | Specify column title alignment             |
| <code>setColHeadingValign</code> | Specify column title vertical alignment    |
| <code>setColWidth</code>         | Specify column widths                      |
| <code>setEntries</code>          | Set contents of table                      |
| <code>setEntry</code>            | Add cell to table                          |
| <code>setEntryAlign</code>       | Specify table cell alignment               |
| <code>setEntryValign</code>      | Specify table cell vertical alignment      |
| <code>setHeading</code>          | Specify table title                        |
| <code>setHeadingAlign</code>     | Specify table title alignment              |
| <code>setRowHeading</code>       | Specify table row title                    |
| <code>setRowHeadingAlign</code>  | Specify table row title alignment          |
| <code>setRowHeadingValign</code> | Specify table row title vertical alignment |

# ModelAdvisor.Table

---

## **Copy Semantics**

Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.

## **See Also**

“Model Advisor Customization”

## **How To**

- “Authoring Checks”
- “Format Model Advisor Results”

**Purpose**

Create table

**Syntax**

```
table = ModelAdvisor.Table(row, column)
```

**Description**

`table = ModelAdvisor.Table(row, column)` creates a table object (`table`). The Model Advisor displays the table object containing the specified number of rows (`row`) and columns (`column`).

**Examples**

In the following example, you create two table objects, `table1` and `table2`. The Model Advisor displays `table1` in the results as a table with 1 row and 1 column. The Model Advisor display `table2` in the results as a table with 2 rows and 3 columns.

```
table1 = ModelAdvisor.Table(1,1);  
table2 = ModelAdvisor.Table(2,3);
```

**See Also**

“Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Task

---

**Purpose** Define custom tasks

**Description** The `ModelAdvisor.Task` class is a wrapper for a check so that you can access the check with the Model Advisor.

You can use one `ModelAdvisor.Check` object in multiple `ModelAdvisor.Task` objects, allowing you to place the same check in multiple locations in the Model Advisor tree. For example, **Check for implicit signal resolution** is displayed in the **By Product > Simulink** folder and in the **By Task > Model Referencing** folder in the Model Advisor tree.

When adding checks as tasks, the Model Advisor uses the task properties instead of the check properties, except for `Visible` and `LicenseName`.

**Construction** `ModelAdvisor.Task` Define custom tasks

**Methods** `setCheck` Specify check used in task

**Properties**

|                          |                                                        |
|--------------------------|--------------------------------------------------------|
| <code>Description</code> | Description of task                                    |
| <code>DisplayName</code> | Name of task                                           |
| <code>Enable</code>      | Indicate if user can enable and disable task           |
| <code>ID</code>          | Identifier for task                                    |
| <code>LicenseName</code> | Product license names required to display and run task |
| <code>MAObj</code>       | Model Advisor object                                   |
| <code>Value</code>       | Status of task                                         |
| <code>Visible</code>     | Indicate to display or hide task                       |

## Copy Semantics

Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation.

## Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');  
MAT3 = ModelAdvisor.Task('com.mathworks.sample.TaskSample3');
```

## See Also

“Model Advisor Customization”

## How To

- “Authoring Checks”

# ModelAdvisor.Task

---

**Purpose** Define custom tasks

**Syntax** `task_obj = ModelAdvisor.Task(task_ID)`

**Description** `task_obj = ModelAdvisor.Task(task_ID)` creates a task object, `task_obj`, with a unique identifier, `task_ID`. `task_ID` must remain constant. If you do not specify `task_ID`, the Model Advisor assigns a random `task_ID` to the task object.

You can use one `ModelAdvisor.Check` object in multiple `ModelAdvisor.Task` objects, allowing you to place the same check in multiple locations in the Model Advisor tree. For example, **Check for implicit signal resolution** appears in the **By Product > Simulink folder** and in the **By Task > Model Referencing** folder in the Model Advisor tree.

When adding checks as tasks, the Model Advisor uses the task properties instead of the check properties, except for `Visible` and `LicenseName`.

**Examples** In the following example, you create three task objects, `MAT1`, `MAT2`, and `MAT3`.

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');  
MAT3 = ModelAdvisor.Task('com.mathworks.sample.TaskSample3');
```

**See Also** “Model Advisor Customization”

**How To** • “Authoring Checks”

|                       |                                                                                                                                    |                                    |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Purpose</b>        | Create Model Advisor text output                                                                                                   |                                    |
| <b>Description</b>    | Instances of <code>ModelAdvisor.Text</code> class create formatted text for the Model Advisor output.                              |                                    |
| <b>Construction</b>   | <code>ModelAdvisor.Text</code>                                                                                                     | Create Model Advisor text output   |
| <b>Methods</b>        | <code>setBold</code>                                                                                                               | Specify bold text                  |
|                       | <code>setColor</code>                                                                                                              | Specify text color                 |
|                       | <code>setHyperlink</code>                                                                                                          | Specify hyperlinked text           |
|                       | <code>setItalic</code>                                                                                                             | Italicize text                     |
|                       | <code>setRetainSpaceReturn</code>                                                                                                  | Retain spacing and returns in text |
|                       | <code>setSubscript</code>                                                                                                          | Specify subscripted text           |
|                       | <code>setSuperscript</code>                                                                                                        | Specify superscripted text         |
|                       | <code>setUnderlined</code>                                                                                                         | Underline text                     |
| <b>Copy Semantics</b> | Handle. To learn how this affects your use of the class, see Copying Objects in the MATLAB Programming Fundamentals documentation. |                                    |
| <b>Examples</b>       | <pre>t1 = ModelAdvisor.Text('This is some text');</pre>                                                                            |                                    |
| <b>See Also</b>       | “Model Advisor Customization”                                                                                                      |                                    |
| <b>How To</b>         | <ul style="list-style-type: none"><li>• “Authoring Checks”</li><li>• “Format Model Advisor Results”</li></ul>                      |                                    |

# ModelAdvisor.Text

---

**Purpose** Create Model Advisor text output

**Syntax** `text = ModelAdvisor.Text(content, {attribute})`

**Description** `text = ModelAdvisor.Text(content, {attribute})` creates a text object for the Model Advisor output.

## Input Arguments

- |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>content</i>   | Optional string specifying the content of the text object. If <i>content</i> is empty, empty text is output.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>attribute</i> | Optional cell array of strings specifying the formatting of the content. If no attribute is specified, the output text has default coloring with no formatting. Possible formatting options include: <ul style="list-style-type: none"><li>• <code>normal</code> (default) — Text is default color and style.</li><li>• <code>bold</code> — Text is bold.</li><li>• <code>italic</code> — Text is italicized.</li><li>• <code>underline</code> — Text is underlined.</li><li>• <code>pass</code> — Text is green.</li><li>• <code>warn</code> — Text is yellow.</li><li>• <code>fail</code> — Text is red.</li><li>• <code>keyword</code> — Text is blue.</li><li>• <code>subscript</code> — Text is subscripted.</li><li>• <code>superscript</code> — Text is superscripted.</li></ul> |



## Output Arguments

text                      The text object you create

## Examples

```
text = ModelAdvisor.Text('Sub entry 1', {'pass','bold'})
```

## See Also

“Model Advisor Customization”

## How To

- “Authoring Checks”
- “Format Model Advisor Results”

# overflowsaturationinfo

---

**Purpose** Retrieve saturation on integer overflow coverage from cvdata object

**Syntax**

```
coverage = overflowsaturationinfo(cvdata, object)
coverage = overflowsaturationinfo(cvdata, object,
    ignore_descendants)
[coverage, description] = overflowsaturationinfo(cvdata,
    object)
```

**Description** `coverage = overflowsaturationinfo(cvdata, object)` returns saturation on integer overflow coverage results from the cvdata object `cvdata` for the model object specified by `object` and its descendants.

`coverage = overflowsaturationinfo(cvdata, object, ignore_descendants)` returns saturation on integer overflow coverage results from the cvdata object `cvdata` for the model object specified by `object` and, depending on the value of `ignore_descendants`, descendant objects.

`[coverage, description] = overflowsaturationinfo(cvdata, object)` returns saturation on integer overflow coverage results from the cvdata object `cvdata` for the model object specified by `object`, and textual descriptions of each coverage outcome.

## Input Arguments

### **cvdata - Coverage results data**

cvdata object

Coverage results data, specified as a cvdata object.

### **object - Model or model component**

full path | handle

Model or model component, specified as a full path, handle, or array of paths or handles.

| Object Specification | Description                                                                                                                            |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| BlockPath            | Full path to a model or block                                                                                                          |
| BlockHandle          | Handle to a model or block                                                                                                             |
| s1Obj                | Handle to a Simulink API object                                                                                                        |
| sfID                 | Stateflow ID                                                                                                                           |
| sfObj                | Handle to a Stateflow API object                                                                                                       |
| {BlockPath, sfID}    | Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart           |
| {BlockPath, sfObj}   | Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart |
| [BlockHandle, sfID]  | Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart                |

**Example:** 'slvndemo\_saturation\_on\_overflow\_coverage'

**Example:**

```
get_param('slvndemo_cv_small_controller/Saturation',
'Handle')
```

### **ignore\_descendants - Preference to ignore coverage of descendant objects**

0 (default) | 1

Preference to ignore coverage of descendant objects, specified as a logical value.

- 1 — Ignore coverage of descendant objects
- 0 — Collect coverage for descendant objects

# overflowsaturationinfo

---

## Output Arguments

### Data Types

logical

### **coverage - Saturation on overflow coverage results for object**

numerical vector

Saturation on overflow coverage results, stored in a two-element vector of the form [covered\_outcomes total\_outcomes]. The two elements are:

|                  |                                                                        |
|------------------|------------------------------------------------------------------------|
| covered_outcomes | Number of saturation on integer overflow outcomes satisfied for object |
| total_outcomes   | Total number of saturation on integer overflow outcomes for object     |

### Data Types

double

### **description - Textual description of coverage outcomes**

structure array

Textual description of coverage outcomes for the model component specified by `object`, returned as a structure array. Depending on the types of model coverage collected, the structure array can have different fields. If only saturation on overflow coverage is collected, the structure array contains the following fields:

|                               |                                                                                                                                                                                                                                                                                                              |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>isFiltered</code>       | 0 if the model component specified by <code>object</code> is not excluded from coverage recording. 1 if the model component specified by <code>object</code> is excluded from coverage recording. For more information about excluding objects from coverage, see “Coverage Filtering”.                      |
| <code>decision.text</code>    | 'Saturate on integer overflow'                                                                                                                                                                                                                                                                               |
| <code>decision.outcome</code> | Structure array containing two fields for each coverage outcome:<br><br><code>executionCountNumber</code><br>of times<br>saturation<br>on integer<br>overflow<br>for <code>object</code><br>evaluated to<br>the outcome<br>described by<br><code>text</code> .<br><br><code>text</code> 'true' or<br>'false' |

Saturation on integer overflow has two possible outcomes, 'true' and 'false'.

|                                       |                                                                                                                                                                                                                                                                                         |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>decision.isFiltered</code>      | 0 if the model component specified by <code>object</code> is not excluded from coverage recording. 1 if the model component specified by <code>object</code> is excluded from coverage recording. For more information about excluding objects from coverage, see “Coverage Filtering”. |
| <code>decision.filterRationale</code> | Rationale for filtering the model component specified by <code>object</code> , if <code>object</code> is excluded from coverage and a rationale is specified. For more information about excluding objects from coverage, see “Coverage Filtering”.                                     |

## Data Types

struct

## Examples

### Collect Saturation on Integer Overflow Coverage for MinMax Block

Collect saturation on integer overflow coverage information for a MinMax block in the example model `sldemo_fuelsys`.

Open the `sldemo_fuelsys` example model. Create a model coverage test specification object for the Mixing & Combustion subsystem of the Engine Gas Dynamics subsystem.

```
open_system('sldemo_fuelsys');  
testObj = cvtest('sldemo_fuelsys/Engine Gas Dynamics/' ...  
    'Mixing & Combustion');
```

In the model coverage test specification object, specify to collect saturation on overflow coverage.

```
testObj.settings.overflowsaturation = 1;
```

Simulate the model and collect coverage results in a new cvdata object.

```
dataObj = cvsim(testObj);
```

Get the saturation on overflow coverage results for the MinMax block in the Mixing & Combustion subsystem. The coverage results are stored in a two-element vector of the form [covered\_outcomes total\_outcomes].

```
blockHandle = get_param('sldemo_fuelsys/' ...  
    'Engine Gas Dynamics/Mixing & Combustion/MinMax','Handle');  
covResults = overflowsaturationinfo(dataObj, blockHandle)
```

```
covResults =
```

```
    1    2
```

One out of two saturation on integer overflow decision outcomes were satisfied for the MinMax block in the Mixing & Combustion subsystem, so it received 50% saturation on integer overflow coverage.

## **Collect Saturation on Integer Overflow Coverage and Description for Example Model**

Collect saturation on integer overflow coverage for the example model `slvndemo_saturation_on_overflow_coverage`. Review collected coverage results and description for Sum block in Controller subsystem.

Open the `slvndemo_saturation_on_overflow_coverage` example model.

```
open_system('slvndemo_saturation_on_overflow_coverage');
```

Simulate the model and collect coverage results in a new cvdata object.

```
dataObj = cvsim('slvndemo_saturation_on_overflow_coverage');
```

Retrieve saturation on integer overflow coverage results and description for the Sum block in the Controller subsystem of the Test Unit subsystem.

# overflowsaturationinfo

---

```
[covResults covDesc] = overflowsaturationinfo(dataObj, ...  
    'slvndemo_saturation_on_overflow_coverage/Test Unit /' ...  
    'Controller/Sum')
```

```
covResults =
```

```
    1    2
```

```
covDesc =
```

```
    isFiltered: 0  
    decision: [1x1 struct]
```

One out of two saturation on integer overflow decision outcomes were satisfied for the Sum block, so it received 50% saturation on integer overflow coverage.

Review the number of times the Sum block evaluated to each saturation on integer overflow outcome during simulation.

```
covDesc.decision.outcome(1)
```

```
ans =
```

```
    executionCount: 3  
           text: 'false'
```

```
covDesc.decision.outcome(2)
```

```
ans =
```

```
    executionCount: 0  
           text: 'true'
```

During simulation, integer overflow did not occur in the Sum block.



If integer overflow is not possible for a block in your model, consider clearing the **Saturate on integer overflow** block parameter to optimize efficiency of your generated code.

## See Also

[cvtest](#) | [cvsim](#) | [decisioninfo](#) | [complexityinfo](#) | [conditioninfo](#) | [getCoverageInfo](#) | [mcdcinfo](#) | [sigrangeinfo](#) | [sigsizeinfo](#) | [tableinfo](#)

## Related Examples

- “Command Line Verification Tutorial”

## Concepts

- “Saturate on Integer Overflow Coverage”

# ModelAdvisor.Root.publish

---

**Purpose** Publish object in Model Advisor root

**Syntax**

```
publish(root_obj, check_obj, location)
publish(root_obj, group_obj)
publish(root_obj, procedure_obj)
publish(root_obj, fg_obj)
```

**Description** `publish(root_obj, check_obj, location)` specifies where the Model Advisor places the check in the Model Advisor tree. `location` is either one of the subfolders in the **By Product** folder, or the name of a new subfolder to put in the **By Product** folder. Use a pipe-delimited string to indicate multiple subfolders. For example, to add a check to the **Simulink Verification and Validation > Modeling Standards** folder, use the following string: 'Simulink Verification and Validation|Modeling Standards'.

If the **By Product** is not displayed in the Model Advisor window, select **Show By Product Folder** from the **Settings > Preferences** dialog box.

`publish(root_obj, group_obj)` specifies the `ModelAdvisor.Group` object to publish as a folder in the **Model Advisor Task Manager** folder.

`publish(root_obj, procedure_obj)` specifies the `ModelAdvisor.Procedure` object to publish.

`publish(root_obj, fg_obj)` specifies the `ModelAdvisor.FactoryGroup` object to publish as a subfolder in the **By Task** folder.

**Examples**

```
% publish check into By Product > Demo group.
mdladvRoot.publish(rec, 'Demo');
```

**How To**

- “Define Where Custom Checks Appear”
- “Define Where Tasks Appear”
- “Define Where Custom Folders Appear”

|                    |                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Register object in Model Advisor root                                                                  |
| <b>Syntax</b>      | <code>register(MAobj, obj)</code>                                                                      |
| <b>Description</b> | <code>register(MAobj, obj)</code> registers the object, <i>obj</i> , in the root object <i>MAobj</i> . |

In the Model Advisor memory, the `register` method registers the following types of objects:

- `ModelAdvisor.Check`
- `ModelAdvisor.FactoryGroup`
- `ModelAdvisor.Group`
- `ModelAdvisor.Procedure`
- `ModelAdvisor.Task`

The `register` method places objects in the Model Advisor memory that you use in other functions. The `register` method does not place objects in the Model Advisor tree.

## Examples

```
mdladvRoot = ModelAdvisor.Root;

MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');
MAT1.DisplayName='Example task with input parameter and auto-fix ability';
MAT1.setCheck('com.mathworks.sample.Check1');
mdladvRoot.register(MAT1);

MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');
MAT2.DisplayName='Example task 2';
MAT2.setCheck('com.mathworks.sample.Check2');
mdladvRoot.register(MAT2);

MAT3 = ModelAdvisor.Task('com.mathworks.sample.TaskSample3');
MAT3.DisplayName='Example task 3';
MAT3.setCheck('com.mathworks.sample.Check3');
```

# ModelAdvisor.Root.register

---

```
mdladvRoot.register(MAT3)
```

**Purpose**

Interact programmatically with Requirements Management Interface

**Syntax**

```
reqlinks = rmi('createEmpty')
reqlinks = rmi('get', model)
reqlinks = rmi('get', sig_builder, group_idx)
rmi('set', model, reqlinks)
rmi('set', sig_builder, reqlinks, group_idx)
rmi('cat', model, reqlinks)
cnt = rmi('count', model)
rmi('clearAll', object)
rmi('clearAll', object, 'deep')
rmi('clearAll', object, 'noprompt')
rmi('clearAll', object, 'deep', 'noprompt')

cmdStr = rmi('navCmd', object)
[cmdStr, titleStr] = rmi('navCmd', object)
object = rmi('guidlookup', model, guidStr)
rmi('highlightModel', object)
rmi('unhighlightModel', object)
rmi('view', object, index)
dialog = rmi('edit', object)
guidStr = rmi('gidget', object)

rmi('report', model)
rmi('report', matlabfilepath)
rmi('projectreport')

rmi setup
rmi register linktypename
rmi unregister linktypename
rmi linktypelist

number_problems = rmi('checkdoc')
number_problems = rmi('checkdoc', docName)
rmi('check', matlabfilepath)

rmi('doorssync', model)
```

```
rmi('setDoorsLabelTemplate', template)
template = rmi('getDoorsLabelTemplate')
label = rmi('doorsLabel', moduleID, objectID)
totalModifiedLinks = rmi('updateDoorsLabels', model)
```

## Description

`reqlinks = rmi('createEmpty')` creates an empty instance of the requirement links data structure.

`reqlinks = rmi('get', model)` returns the requirement links data structure for `model`.

`reqlinks = rmi('get', sig_builder, group_idx)` returns the requirement links data structure for the Signal Builder group specified by the index `group_idx`.

`rmi('set', model, reqlinks)` sets `reqlinks` as the requirements links for `model`.

`rmi('set', sig_builder, reqlinks, group_idx)` sets `reqlinks` as the requirements links for the signal group `group_idx` in the Signal Builder block `sig_builder`.

`rmi('cat', model, reqlinks)` adds the requirements links in `reqlinks` to existing requirements links for `model`.

`cnt = rmi('count', model)` returns the number of requirements links for `model`.

`rmi('clearAll', object)` deletes all requirements links for `object`.

`rmi('clearAll', object, 'deep')` deletes all requirements links in the model containing `object`.

---

`rmi('clearAll', object, 'noprompt')` deletes all requirements links for `object` and does not prompt for confirmation.

`rmi('clearAll', object, 'deep', 'noprompt')` deletes all requirements links in the model containing `object` and does not prompt for confirmation.

`cmdStr = rmi('navCmd', object)` returns the MATLAB command string `cmdStr` used to navigate to `object`.

`[cmdStr, titleStr] = rmi('navCmd', object)` returns the MATLAB command string `cmdStr` and the title string `titleStr` that provides descriptive text for `object`.

`object = rmi('guidlookup', model, guidStr)` returns the object name in `model` that has the globally unique identifier `guidStr`.

`rmi('highlightModel', object)` highlights all of the objects in the parent model of `object` that have requirement links.

`rmi('unhighlightModel', object)` removes highlighting of objects in the parent model of `object` that have requirement links.

`rmi('view', object, index)` accesses the requirement numbered `index` in the requirements document associated with `object`.

`dialog = rmi('edit', object)` displays the Requirements dialog box for `object` and returns the handle of the dialog box.

`guidStr = rmi('gidget', object)` returns the globally unique identifier for `object`. A globally unique identifier is created for `object` if it lacks one.

`rmi('report', model)` generates a Requirements Traceability report in HTML format for `model`.

`rmi('report', matlabfilepath)` generates a Requirements Traceability report in HTML format for the MATLAB code file specified by `matlabfilepath`.

`rmi('projectreport')` generates a Requirements Traceability report in HTML format for the current Simulink Project. The master page of this report has HTTP links to reports for each project item that has requirements traceability associations. For more information, see “Create Requirements Traceability Report for Simulink Project”.

`rmi setup` configures RMI for use with your MATLAB software and installs the interface for use with the IBM® Rational® DOORS® software.

`rmi register linktypename` registers the custom link type specified by the function `linktypename`. For more information, see “Custom Link Type Registration”.

`rmi unregister linktypename` removes the custom link type specified by the function `linktypename`. For more information, see “Custom Link Type Registration”.

`rmi linktypelist` displays a list of the currently registered link types. The list indicates whether each link type is built-in or custom, and provides the path to the function used for its registration.

`number_problems = rmi('checkdoc')` checks validity of links to Simulink from a requirements document in Microsoft® Word, Microsoft Excel®, or IBM Rational DOORS. It prompts for the requirements document name, returns the total number of problems detected, and



---

opens an HTML report in the MATLAB Web browser. For more information, see “Validate Requirements Links in a Requirements Document”.

`number_problems = rmi('checkdoc', docName)` checks validity of links to Simulink from the requirements document specified by `docName`. It returns the total number of problems detected and opens an HTML report in the MATLAB Web browser. For more information, see “Validate Requirements Links in a Requirements Document”.

`rmi('check', matlabfilepath)` checks consistency of traceability links associated with MATLAB code lines in the `.m` file `matlabfilepath`, and opens an HTML report in the MATLAB Web browser.

`rmi('doorssync', model)` opens the DOORS synchronization settings dialog box, where you can customize the synchronization settings and synchronize your model with an open project in an IBM Rational DOORS database. See `rmi.doorssync` for information about synchronizing your model with DOORS at the MATLAB command line.

`rmi('setDoorsLabelTemplate', template)` specifies a new custom template for labels of requirements links to IBM Rational DOORS. The default label template contains the section number and object heading for the DOORS requirement link target. To revert the link label template back to the default, enter `rmi('setDoorsLabelTemplate', '')` at the MATLAB command prompt.

`template = rmi('getDoorsLabelTemplate')` returns the currently specified custom template for labels of requirements links to IBM Rational DOORS.

`label = rmi('doorsLabel', moduleID, objectID)` generates a label for the requirements link to the IBM Rational DOORS object specified

by `objectID` in the DOORS module specified by `moduleID`, according to the current template.

`totalModifiedLinks = rmi('updateDoorsLabels', model)` updates all IBM Rational DOORS requirements links labels in `model` according to the current template.

## Input Arguments

### **model - Simulink or Stateflow model with which requirements can be associated**

`name` | `handle`

Simulink or Stateflow model with which requirements can be associated, specified as a string or handle.

**Example:** `'slvnvdemo_officereq'`

#### **Data Types**

`char`

### **object - Model object with which requirements can be associated**

`name` | `handle`

Model object with which requirements can be associated, specified as a string or handle.

**Example:** `'slvnvdemo_fuelsys_htmreq/fuel rate controller/Airflow calculation'`

#### **Data Types**

`char`

### **sig\_builder - Signal Builder block containing signal group with requirements traceability associations**

`name` | `handle`

Signal Builder block containing signal group with requirements traceability associations, specified as a string or handle.

#### **Data Types**

`char`

**group\_idx - Signal Builder group index**

integer

Signal Builder group index, specified as a scalar.

**Example:** 2**Data Types**

char

**matlabfilepath - MATLAB code file with requirements traceability associations**

path

MATLAB code file with requirements traceability associations, specified as the path to the file.

**Example:****Data Types**

char

**guidStr - Globally unique identifier for model object**

string

Globally unique identifier for model object `object`, specified as a string.**Example:** GIDa\_59e165f5\_19fe\_41f7\_abc1\_39c010e46167**Data Types**

char

**index - Index number of requirement linked to model object**

integer

Index number of requirement linked to model object, specified as an integer.

**docName - Requirements document in external application**

file name | path

Requirements document in external application, specified as a string that represents one of the following:

- IBM Rational DOORS module ID.
- path to Microsoft Word requirements document.
- path to Microsoft Excel requirements document.

For more information, see “Validate Requirements Links in a Requirements Document”.

**label - Label for links to requirements in IBM Rational DOORS**

string

**Example:**

**Data Types**

char

**template - Template label for links to requirements in IBM Rational DOORS**

string

Template label for links to requirements in IBM Rational DOORS, specified as a string.

You can use the following format specifiers to include the associated DOORS information in your requirements links labels:

|    |                        |
|----|------------------------|
| %h | Object heading         |
| %t | Object text            |
| %p | Module prefix          |
| %n | Object absolute number |
| %m | Module ID              |
| %P | Project name           |
| %M | Module name            |

|                   |                                   |
|-------------------|-----------------------------------|
| %U                | DOORS URL                         |
| %<ATTRIBUTE_NAME> | Other DOORS attribute you specify |

**Example:** '%m:%n [backup=%<Backup>]'

### Data Types

char

### **moduleID - IBM Rational DOORS module**

DOORS module ID

IBM Rational DOORS module, specified as the unique DOORS module ID.

**Example:**

### Data Types

char

### **objectID - IBM Rational DOORS object**

DOORS object ID

IBM Rational DOORS object in the DOORS module `moduleID`, specified as the locally unique DOORS ID.

**Example:**

### Data Types

char

## Output Arguments

### **reqlinks - Requirement links data**

struct

Requirement links data, returned as a structure array with the following fields:

**doc** String identifying requirements document

**id** String defining location in requirements document. The first character specifies the identifier type:

| <b>First Character</b> | <b>Identifier</b>                                                                  | <b>Example</b>   |
|------------------------|------------------------------------------------------------------------------------|------------------|
| ?                      | Search text, the first occurrence of which is located in requirements document     | '?Requirement 1' |
| @                      | Named item, such as bookmark in a Microsoft Word file or an anchor in an HTML file | '@my_req'        |
| #                      | Page or item number                                                                | '#21'            |
| >                      | Line number                                                                        | '>3156'          |
| \$                     | Worksheet range in a spreadsheet                                                   | '\$A2:C5'        |

**linked** Boolean value specifying whether the requirement link is accessible for report generation and highlighting:

1 (default). Highlight model object and include requirement link in reports.

0

**description** String describing the requirement

**keywords** Optional string supplementing description

**reqsys** String identifying the link type registration name; 'other' for built-in link types

**cmdStr - Command string used to navigate to model object**

string

Command string used to navigate to model object `object`, returned as a string.

**Example:**

```
rmiobjnavigate('slvnvdemo_fuelsys_officereq.slx', 'GIDa_59e165f5_19fe_4
```

**titleStr - Textual description of model object with requirements links**

string

Textual description of model object with requirements links, returned as a string.

**Example:** `slvnvdemo_fuelsys_officereq/.../Airflow calculation/Pumping Constant (Lookup2D)`

**guidStr - Globally unique identifier for model object**

string

Globally unique identifier for model object `object`, returned as a string.

**Example:** `GIDa_59e165f5_19fe_41f7_abc1_39c010e46167`

**dialog - Requirements dialog box for model object**

handle

Requirements dialog box for model object `object`, returned as a handle to the dialog box.

**number\_problems - Total count of invalid links detected in external document**

integer

Total count of invalid links detected in external document `docName`.

For more information, see “Validate Requirements Links in a Requirements Document”.

## **totalModifiedLinks - Total count of DOORS requirements links updated with new label template**

integer

Total count of DOORS requirements links updated with new label template.

## **Examples**

### **Requirements Links Management in Example Model**

Get a requirement associated with a block in the `slvndemo_fuelsys_htmreq` model, change its description, and save the requirement back to that block. Define a new requirement link and add it to the existing requirements links in the block.

Get requirement link associated with the Airflow calculation block in the `slvndemo_fuelsys_htmreq` example model.

```
slvndemo_fuelsys_htmreq;  
blk_with_req = ['slvndemo_fuelsys_htmreq/fuel rate' 10 'controller/...  
    Airflow calculation'];  
reqts = rmi('get', blk_with_req);
```

Change the description of the requirement link.

```
reqts.description = 'Mass airflow estimation';
```

Save the changed requirement link description for the Airflow calculation block.

```
rmi('set', blk_with_req, reqts);
```

Create new requirement link to example document `fuelsys_requirements2.htm`.

```
new_req = rmi('createempty');  
new_req.doc = 'fuelsys_requirements2.htm';  
new_req.description = 'A new requirement';
```



Add new requirement link to existing requirements links for the Airflow calculation block.

```
rmi('cat', blk_with_req, new_req);
```

### **Requirements Traceability Report for Example Model**

Create HTML report of requirements traceability data in example model.

Create an HTML requirements report for the slvndemo\_fuelsys\_htmreq example model.

```
rmi('report', 'slvndemo_fuelsys_htmreq');
```

The MATLAB Web browser opens, showing the report.

### **Labels for Requirements Links to IBM Rational DOORS**

Specify a new label template for links to requirements in DOORS, and update labels of all DOORS requirements links in your model to fit the new template.

Specify a new label template for requirements links to IBM Rational DOORS so that new links to DOORS objects are labeled with the corresponding module ID, object absolute number, and the value of the 'Backup' attribute.

```
rmi('setDoorsLabelTemplate', '%m:%n [backup=%<Backup>]');
```

Update existing DOORS requirements link labels to match the new specified template in your model `example_model`. When updating labels, DOORS must be running and all linked modules must be accessible for reading.

```
rmi('updateDoorsLabels', example_model);
```

## See Also

`rmipref` | `rmiobjnavigate` | `rmidocrename` | `rmitag`  
| `rmidata.default` | `rmidata.map` | `rmi.doorssync` |  
`RptgenRMI.doorsAttribs`

## Concepts

- “Requirements Management Interface Setup”
- “Maintenance of Requirements Links”

**Purpose** Specify default storage location of requirements traceability data for new models

**Syntax** `rmidata.default(storage_setting)`

**Description** `rmidata.default(storage_setting)` specifies whether requirements traceability data for new Simulink models is stored in the model file or in an external `.req` file. This function does not affect models that already have saved requirements traceability data.

## Input Arguments

### **storage\_setting**

String that specifies where requirements traceability data for a model is stored:

- `'internal'` — Store requirements traceability data in the model file.
- `'external'` — Store requirements traceability data in a separate file. The default name for this file is `model_name.req`.

## Examples

Specify to store requirements traceability data in the model file:

```
rmidata.default('internal');
```

---

Specify to store requirements traceability data in an external `.req` file:

```
rmidata.default('external');
```

## Alternatives

To set the storage location from the Simulink Editor:

- 1** Select **Analysis > Requirements > Settings**.
- 2** Select the **Storage** tab.
- 3** Select one of the following options:
  - **Store internally (embedded in a model file)**

# rmidata.default

---

- **Store externally (in a separate \*.req file)**

## **See Also**

rmi | rmidata.export | rmidata.map | rmidata.save

## **How To**

- “Specify Storage for Requirements Links”
- “Requirements Link Storage”

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>          | Move requirements traceability data to external .req file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>           | <pre>[total_linked,total_links] = rמידata.export [total_linked,total_links] = rמידata.export(model)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>      | <p>[total_linked,total_links] = rמידata.export moves requirements traceability data associated with the current Simulink model to an external file named <i>model_name</i>.req. rמידata.export saves the file in the same folder as the model. rמידata.export deletes the requirements traceability data stored in the model and saves the modified model.</p> <p>[total_linked,total_links] = rמידata.export(model) moves requirements traceability data associated with <i>model</i> to an external file named <i>model_name</i>.req. rמידata.export saves the file in the same folder as <i>model</i>. rמידata.export deletes the requirements traceability data stored in the model and saves the modified model.</p> |
| <b>Input Arguments</b>  | <p><b>model</b></p> <p>Name or handle of a Simulink model</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Output Arguments</b> | <p><b>total_linked</b></p> <p>Integer indicating the number of objects in the model that have linked requirements</p> <p><b>total_links</b></p> <p>Integer indicating the total number of requirements links in the model</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Examples</b>         | <p>Move the requirements traceability data from the slvnvdemo_fuelsys_officereq model to an external file:</p> <pre>rמידata.export('slvnvdemo_fuelsys_officereq');</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>See Also</b>         | <p>rmi   rמידata.save   rמידata.default   rמידata.map</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## **How To**

- “Specify Storage for Requirements Links”
- “Requirements Link Storage”

**Purpose** Associate externally stored requirements traceability data with model

**Syntax**

```
rמידata.map(model, reqts_file)
rמידata.map(model, 'undo')
rמידata.map(model, 'clear')
```

**Description**

`rמידata.map(model, reqts_file)` associates the requirements traceability data from `reqts_file` with the Simulink model `model`.

`rמידata.map(model, 'undo')` removes from the `.req` file associated with `model` the requirements traceability data that was most recently saved in the `.req` file.

`rמידata.map(model, 'clear')` removes from the `.req` file associated with `model` all requirements traceability data.

## Input Arguments

### **model**

Name, handle, or full path for a Simulink model

### **reqts\_file**

Full path to the `.req` file that contains requirements traceability data for the model

## Alternatives

To load a file that contains requirements traceability data for a model:

- 1 Open the model.
- 2 Select **Analysis > Requirements > Load Links**.

---

**Note** The **Load Links** menu item appears only when your model is configured to store requirements data externally. To specify external storage of requirements data for your model, in the Requirements Settings dialog box under **Storage > Default storage location for requirements links data**, select **Store externally (in a separate \*.req file)**.

---

**3** Browse to the .req file that contains the requirements links.

**4** Click **OK**.

## Examples

Associate an external requirements traceability data file with a Simulink model. After associating the information with the model, view the objects with linked requirements by highlighting the model.

```
open_system('slvndemo_powerwindowController');
reqFile = fullfile(matlabroot, 'toolbox', 'slvnv', ...
    'rמידemos', 'powerwin_reqs', ...
    'slvndemo_powerwindowRequirements.req');
rמידata.map('slvndemo_powerwindowController', reqFile);
rמיד('highlightModel', 'slvndemo_powerwindowController');
```

To clear the requirements you just associated with that model, run this rמידata.map command:

```
rמידata.map('slvndemo_powerwindowController', 'clear');
```

## See Also

rמיד | rמידata.save | rמידata.default | rמידata.export

## How To

- “Specify Storage for Requirements Links”
- “Requirements Link Storage”



|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Save requirements traceability data in external .req file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax</b>          | <code>rmidata.save(model)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>     | <code>rmidata.save(model)</code> saves requirements traceability data for a model in an external .req file. The model must be configured to store requirements traceability data externally. This function is equivalent to <b>Analysis &gt; Requirements &gt; Save Links</b> in the Simulink Editor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Input Arguments</b> | <p><b>model - Name or handle of model with requirements links</b><br/>string   handle</p> <p>Name of model with requirements links, specified as a string, or handle to model with requirements links. The model must be loaded into memory and configured to store requirements traceability data externally.</p> <p>If you have a new model with no existing requirements links, configure it for external storage as described in “Specify Storage for Requirements Links”. You can also use the <code>rmidata.default</code> command to specify storage settings.</p> <p>If you have an existing model with internally stored requirements traceability data, convert that data to external storage as described in “Move Internally Stored Requirements Links to External Storage”. You can also use the <code>rmidata.export</code> command to convert existing requirements traceability data to external storage.</p> <p><b>Example:</b> <code>'slvndemo_powerwindowController'</code></p> <p><b>Example:</b> <code>get_param(gcs, 'Handle')</code></p> |
| <b>Examples</b>        | <p><b>Create New Requirement Link and Save Externally</b></p> <p>Add a requirement link to an existing example model, and save the model requirements traceability data in an external file.</p> <p>Open the example model, <code>slvndemo_powerwindowController</code>.</p> <pre>open_system('slvndemo_powerwindowController');</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Specify that the model store requirements data externally.

```
rmidata.default('external');
```

Create a new requirements link structure.

```
newReqLink = rmi('createEmpty');  
newReqLink.description = 'newReqLink';
```

Specify the requirements document that you want to link to from the model. In this case, an example requirements document is provided.

```
newReqLink.doc = [matlabroot '\toolbox\slvnm\rmidemos\' ...  
    'powerwin_reqs\PowerWindowSpecification.docx'];
```

Specify the text of the requirement within the document to which you want to link.

```
newReqLink.id = '?passenger input consists of a vector' ...  
    'with three elements';
```

Specify that the new requirements link that you created be attached to the Mux4 block of the slvnm\_demo\_powerwindowController example model.

```
rmi('set', 'slvnm_demo_powerwindowController/Mux4', newReqLink);
```

Save the new requirement link that you just created in an external .req file associated with the model.

```
rmidata.save('slvnm_demo_powerwindowController');
```

This function is equivalent to the Simulink Editor option **Analysis > Requirements > Save Links**.

To highlight the Mux4 block, turn on requirements highlighting for the slvnm\_demo\_powerwindowController example model.

```
rmi('highlightModel', 'slvnm_demo_powerwindowController');
```

You can test your requirements link by right-clicking the Mux4 block. In the context menu, select **Requirements > 1. “newReqLink”**.

Close the example model.

```
close_system('slvndemo_powerwindowController', 0);
```

You are not prompted to save unsaved changes because you saved the requirements link data outside the model file. The model file remains unchanged.

## See Also

[rmidata.map](#) | [rmidata.default](#) | [rmidata.export](#)

## Related Examples

- “Managing Requirements Without Modifying Simulink Model Files”

## Concepts

- “Requirements Link Storage”

# rmidocrename

---

**Purpose** Update model requirements document paths and file names

**Syntax** `rmidocrename(model_handle, old_path, new_path)`  
`rmidocrename(model_name, old_path, new_path)`

**Description** `rmidocrename(model_handle, old_path, new_path)` collectively updates the links from a Simulink model to requirements files whose names or locations have changed. `model_handle` is a handle to the model that contains links to the files that you have moved or renamed. `old_path` is a string that contains the existing full or partial file or path name. `new_path` is a string with the new full or partial file or path name.

`rmidocrename(model_name, old_path, new_path)` updates the links to requirements files associated with `model_name`. You can pass `rmidocrename` a model handle or a model file name.

When using the `rmidocrename` function, make sure to enter specific strings for the old document name fragments so that you do not inadvertently modify other links.

**Examples** For the current Simulink model, update all links to requirements files that contain the string 'project\_0220', replacing them with 'project\_0221':

```
rmidocrename(gcs, 'project_0220', 'project_0221')  
Processed 6 objects with requirements, 5 out of 13 links were modified.
```

**Alternatives** To update the requirements links one at a time, for each model object that has a link:

- 1 For each object with requirements, open the Requirements Traceability Link Editor by right-clicking and selecting **Requirements Traceability > Open Link Editor**.
- 2 Edit the **Document** field for each requirement that points to a moved or renamed document.

**3** Click **Apply** to save the changes.

## **See Also**

`rmi`

# rmi.doorssync

---

**Purpose** Synchronize model with DOORS surrogate module

**Syntax**

```
rmi.doorssync(model_name)
rmi.doorssync(model_name, settings)
current_settings = rmi.doorssync(model_name, 'settings')
current_settings = rmi.doorssync(model_name, [])
default_settings = rmi.doorssync([])
```

**Description** `rmi.doorssync(model_name)` opens the DOORS synchronization settings dialog box. Select the options for synchronizing `model_name` with an IBM Rational DOORS surrogate module and click **Synchronize**.

Synchronizing a Simulink model with a DOORS surrogate module is a user-initiated process that creates or updates a surrogate module in a DOORS database. A surrogate module is a DOORS formal module that is a representation of a Simulink model hierarchy. When you first synchronize a model, the DOORS software creates a surrogate module. Depending on your synchronization settings, the surrogate module contains a representation of the model.

`rmi.doorssync(model_name, settings)` synchronizes `model_name` with a DOORS surrogate module using the options that `settings` specifies.

`current_settings = rmi.doorssync(model_name, 'settings')` returns the current settings for `model_name`, but does not synchronize the model with the DOORS surrogate module.

`current_settings = rmi.doorssync(model_name, [])` performs synchronization with current settings known for `model_name`. If the RMI has not synchronized the model previously, `rmi.doorssync` uses the default settings.

`default_settings = rmi.doorssync([])` returns a `settings` object with the default values.

## Input Arguments

### model\_name

Name or handle of a Simulink model

### settings

Structure with the following fields.

| Field         | Description                                                                                                                                                                                                           |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| surrogatePath | Path to a DOORS project in the form ' <code>/PROJECT/FOLDER/MODULE</code> '.<br><br>The default, ' <code>./\$modelName</code> ', resolves to the given model name under the current DOORS project.                    |
| saveModel     | Saves the model after synchronization.<br><b>Default: 1</b>                                                                                                                                                           |
| saveSurrogate | Saves the modified surrogate module.<br><b>Default: 1</b>                                                                                                                                                             |
| s1ToDoors     | Copies links from Simulink to the surrogate module.<br><b>Default: 0</b>                                                                                                                                              |
| doorsToS1     | Copies links from the surrogate module to Simulink.<br><br>If both <code>doorsToS1</code> and <code>s1ToDoors</code> are set to 1, an error occurs.<br><b>Default: 0</b>                                              |
| purgeSimulink | Removes unmatched links in Simulink (ignored if <code>doorsToS1</code> is set to 0).<br><br><code>rmi.doorssync</code> ignores <code>purgeSimulink</code> if <code>doorsToS1</code> is set to 0.<br><b>Default: 0</b> |

# rmi.doorssync

---

| Field       | Description                                                                                                                                                                                                                                                                                     |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| purgeDoors  | Removes unmatched links in the surrogate module (ignored if slToDoors is set to 0).<br><b>Default: 0</b>                                                                                                                                                                                        |
| detailLevel | Specifies which objects with no links to DOORS to include in the surrogate module.<br>Valid values are 1 through 6. 1 includes only objects with requirements, for fast synchronization. 6 includes all model objects, for complete model representation in the surrogate.<br><b>Default: 1</b> |

## Output Arguments

### **current\_settings**

The current values of the synchronization settings

### **default\_settings**

The default values of the synchronization settings

## Examples

Before running this example:

- 1** Start the DOORS software.
- 2** Create a new DOORS project or open an existing DOORS project.

After you complete the preceding steps, open the `slvnvdemo_fuelsys_officereq` model, specify to copy the links from the model to DOORS, and synchronize the model to create the surrogate module:

```
slvnvdemo_fuelsys_officereq;  
settings = rmi.doorssync('slvnvdemo_fuelsys_officereq', ...  
    'settings');
```



```
settings.slToDoors = 1;  
setting.purgeDoors = 1;  
rmi.doorssync('slvndemo_fuelsys_officereq', settings);
```

## Alternatives

Instead of using `rmi.doorssync`, you can synchronize your Simulink model with a DOORS surrogate module from the Simulink Editor:

- 1** Open the model.
- 2** Select **Analysis > Requirements > Synchronize with DOORS**.
- 3** In the DOORS synchronization settings dialog box, select the desired synchronization settings.
- 4** Click **Synchronize**.

## See Also

`rmi`

## How To

- “Synchronize a Simulink Model to Create a Surrogate Module”
- “Resynchronize DOORS Surrogate Module to Reflect Model Changes”

# rmi.objinfo

---

**Purpose** Return navigation information for model object

**Syntax** [navCmd, dispString] = rmi.objinfo(obj)

**Description** [navCmd, dispString] = rmi.objinfo(obj) returns navigation information for the Simulink model object obj.

**Input Arguments** **obj**  
Name or handle of a Simulink or Stateflow object.

**Output Arguments** **navCmd**  
String that contains the MATLAB command that navigates to the model object obj. Pass this command to the MATLAB Automation server to highlight obj.

**dispString**  
String that contains the name and path to the model object obj.

**Examples** Open the slvndemo\_fuelsys\_officereq example model, get the unique identifier for the MAP Sensor block, and navigate to that block using the rmiobjnavigate function:

```
slvndemo_fuelsys_officereq;           % Open example model
gcb = ...
    'slvndemo_fuelsys_officereq/MAP sensor'; % Make current block
[navCmdString, objPath] = rmi.objinfo(gcb); % Get rmiobjnavigate command
   % and path
```

**See Also** rmi | rmiobjnavigate

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Navigate to model objects using unique Requirements Management Interface identifiers                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Syntax</b>          | <code>rmiobjnavigate(modelPath, guId)</code><br><code>rmiobjnavigate(modelPath, guId, grpNum)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>     | <p><code>rmiobjnavigate(modelPath, guId)</code> navigates to and highlights the specified object in a Simulink model.</p> <p><code>rmiobjnavigate(modelPath, guId, grpNum)</code> navigates to the signal group number <code>grpNum</code> of a Signal Builder block identified by <code>guId</code> in the model <code>modelPath</code>.</p>                                                                                                                                                                                                 |
| <b>Input Arguments</b> | <p><b>modelPath</b><br/>A full path to a Simulink model file, or a Simulink model file name that can be resolved on the MATLAB path.</p> <p><b>guId</b><br/>A unique string that the RMI uses to identify a Simulink or Stateflow object.</p> <p><b>grpNum</b><br/>Integer indicating a signal group number in a Signal Builder block</p>                                                                                                                                                                                                     |
| <b>Examples</b>        | <p>Open the <code>slvndemo_fuelsys_officereq</code> example model, get the unique identifier for the MAP Sensor block:</p> <pre>slvndemo_fuelsys_officereq;           % Open example model gcb = ...     'slvndemo_fuelsys_officereq/MAP sensor'; % Make current block navCmdString = rmi.objinfo(gcb)       % Get rmiobjnavigate command                                          % with model name and object ID</pre> <p><code>rmi.objinfo</code> returns the following value for <code>navCmdString</code>:</p> <pre>navCmdString =</pre> |

# rmiobjnavigate

---

```
rmiobjnavigate('slvndemo_fuelsys_officereq.mdl', ...  
'GIDa_9fc2c968_6068_49c6_968d_b08e363248b9');
```

Navigate to that block using the `rmiobjnavigate` command that `rmi.objinfo` returned:

```
eval(navCmdString); % Execute rmiobjnavigate command
```

## See Also

`rmi` | `rmi.objinfo`

## How To

- “Use the `rmiobjnavigate` Function”

**Purpose** Get or set RMI preferences stored in `prefdir`

**Syntax**

```
rmipref

currentVal = rmipref(prefName)

previousVal = rmipref(Name,Value)
```

**Description** `rmipref` returns list of `Name,Value` pairs corresponding to Requirements Management Interface (RMI) preference names and accepted values for each preference.

`currentVal = rmipref(prefName)` returns the current value of the preference specified by `prefName`.

`previousVal = rmipref(Name,Value)` sets a new value for the RMI preference specified by `Name`, and returns the previous value of that RMI preference.

## Input Arguments

### **prefName - RMI preference name**

```
'BiDirectionalLinking' | 'FilterRequireTags' |  
'CustomSettings' | ...
```

RMI preference name, specified as the corresponding `Name` string listed in “Name-Value Pair Arguments” on page 1-163.

### **Name-Value Pair Arguments**

Specify optional comma-separated pairs of `Name,Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside single quotes ( ' ' ).

**Example:** `'BiDirectionalLinking',true` enables bi-directional linking for your model, so that when you create a selection-based link to a requirements document, the RMI creates a corresponding link to your model from the requirements document.

## **'BiDirectionalLinking' - Bi-directional selection linking preference**

false (default) | true

Bi-directional selection linking preference, specified as a logical value.

This preference specifies whether to simultaneously create return link from target to source when creating link from source to target. This setting applies only for requirements document types that support selection-based linking.

### **Data Types**

logical

## **'DocumentPathReference' - Preference for path format of links to requirements documents from model**

'modelRelative' (default) | 'absolute' | 'pwdRelative' | 'none'

Preference for path format of links to requirements documents from model, specified as one of the following strings.

| <b>String</b>   | <b>Document reference contains...</b>        |
|-----------------|----------------------------------------------|
| 'absolute'      | full absolute path to requirements document. |
| 'pwdRelative'   | path relative to MATLAB current folder.      |
| 'modelRelative' | path relative to model file.                 |
| 'none'          | document file name only.                     |

For more information, see “Document Path Storage”.

### **Data Types**

char

## **'ModelPathReference' - Preference for path format in links to model from requirements documents**

'none' (default) | 'absolute'

Preference for path format in links to model from requirements documents, specified as one of the following strings.

| String     | Model reference contains...  |
|------------|------------------------------|
| 'absolute' | full absolute path to model. |
| 'none'     | model file name only.        |

### Data Types

char

### 'LinkIconFilePath' - Preference to use custom image file as requirements link icon

empty string (default) | full image file path

Preference to use custom image file as requirements link icon, specified as full path to icon or small image file. This image will be used for requirements links inserted in external documents.

### Data Types

char

### 'FilterEnable' - Preference to enable filtering by user tag keywords

false (default) | true

Preference to enable filtering by user tag keywords, specified as a logical value. When you filter by user tag keywords, you can include or exclude subsets of requirements links in highlighting or reports. You can specify user tag keywords for requirements links filtering in the 'FilterRequireTags' and 'FilterExcludeTags' preferences. For more information about requirements filtering, see “Filter Requirements with User Tags”.

### Data Types

logical

### 'FilterRequireTags' - Preference for user tag keywords for requirements links

empty string (default) | comma-separated list of user tag keywords

Preference for user tag keywords for requirements links, specified as a comma-separated list of words or phrases in a string. These user tags apply to all new requirements links you create. Requirements links with these user tags are included in model highlighting and reports. For more information about requirements filtering, see “Filter Requirements with User Tags”.

### Data Types

char

### **‘FilterExcludeTags’ - Preference to exclude certain requirements links from model highlighting and reports**

empty string (default) | comma-separated list of user tag keywords

Preference to exclude certain requirements links from model highlighting and reports, specified as a comma-separated list of user tag keywords. Requirements links with these user tags are excluded from model highlighting and reports. For more information about requirements filtering, see “Filter Requirements with User Tags”.

### Data Types

char

### **‘FilterMenusByTags’ - Preference to disable labels of requirements links with designated user tags**

false (default) | true

Preference to disable labels of requirements links with designated user tags, specified as a logical value. When set to true, if a requirement link has a user tag designated in 'FilterExcludeTags' or 'FilterRequireTags', that requirements link will be disabled in the Requirements context menu. For more information about requirements filtering, see “Filter Requirements with User Tags”.

### Data Types

logical



**'FilterConsistencyChecking' - Preference to filter Model Advisor requirements consistency checks with designated user tags**`false (default) | true`

Preference to filter Model Advisor requirements consistency checks with designated user tags, specified as a logical value. When set to true, Model Advisor requirements consistency checks include requirements links with user tags designated in 'FilterRequireTags' and excludes requirements links with user tags designated in 'FilterExcludeTags'. For more information about requirements filtering, see “Filter Requirements with User Tags”.

**Data Types**`logical`**'KeepSurrogateLinks' - Preference to keep DOORS surrogate links when deleting all requirements links**`empty (default) | false | true`

Preference to keep DOORS surrogate links when deleting all requirements links, specified as a logical value. When set to true, selecting **Requirements > Delete All Links** deletes all requirements links including DOORS surrogate module requirements links. When not set to true or false, selecting **Requirements > Delete All Links** opens a dialog box with a choice to keep or delete DOORS surrogate links.

**Data Types**`logical`**'ReportFollowLibraryLinks' - Preference to include requirements links in referenced libraries in generated report**`false (default) | true`

Preference to include requirements links in referenced libraries in generated report, specified as a logical value. When set to true, generated requirements reports include requirements links in referenced libraries.

## Data Types

logical

### **'ReportHighlightSnapshots' - Preference to include highlighting in model snapshots in generated report**

true (default) | false

Preference to include highlighting in model snapshots in generated report, specified as a logical value. When set to true, snapshots of model objects in generated requirements reports include highlighting of model objects with requirements links.

## Data Types

logical

### **'ReportNoLinkItems' - Preference to include model objects with no requirements links in generated requirements reports**

false (default) | true

Preference to include model objects with no requirements links in generated requirements reports, specified as a logical value. When set to true, generated requirements reports include lists of model objects that have no requirements links.

## Data Types

logical

### **'ReportUseDocIndex' - Preference to include short document ID instead of full path to document in generated requirements reports**

false (default) | true

Preference to include short document ID instead of full path to document in generated requirements reports, specified as a logical value. When set to true, generated requirements reports include short document IDs, when specified, instead of full paths to requirements documents.

## Data Types

logical

**'ReportIncludeTags' - Preference to list user tags for requirements links in generated reports**`false (default) | true`

Preference to list user tags for requirements links in generated reports, specified as a logical value. When set to `true`, generated requirements reports include user tags specified for each requirement link. For more information about requirements filtering, see “Filter Requirements with User Tags”.

**Data Types**`logical`**'ReportDocDetails' - Preference to include extra detail from requirements documents in generated reports**`false (default) | true`

Preference to include extra detail from requirements documents in generated reports, specified as a logical value. When set to `true`, generated requirements reports load linked requirements documents to include additional information about linked requirements. This preference applies to Microsoft Word, Microsoft Excel, and IBM Rational DOORS requirements documents only.

**Data Types**`logical`**'ReportLinkToObjects' - Preference to include links to model objects in generated requirements reports**`false (default) | true`

Preference to include links to model objects in generated requirements reports, specified as a logical value. When set to `true`, generated requirements reports include links to model objects. These links work only if the MATLAB internal HTTP server is active.

**Data Types**`logical`

## **'SelectionLinkWord' - Preference to include Microsoft Word selection link option in Requirements context menu**

true (default) | false

Preference to include Microsoft Word selection link option in Requirements context menu, specified as a logical value.

### **Data Types**

logical

## **'SelectionLinkExcel' - Preference to include Microsoft Excel selection link option in Requirements context menu**

true (default) | false

Preference to include Microsoft Excel selection link option in Requirements context menu, specified as a logical value.

### **Data Types**

logical

## **'SelectionLinkDoors' - Preference to include IBM Rational DOORS selection link option in Requirements context menu**

true (default) | false

Preference to include IBM Rational DOORS selection link option in Requirements context menu, specified as a logical value.

### **Data Types**

logical

## **'SelectionLinkTag' - Preference for user tags to apply to new selection-based requirements links**

empty string (default) | comma-separated list of user tag keywords

Preference for user tags to apply to new selection-based requirements links, specified as a comma-separated list of words or phrases in a string. These user tags automatically apply to new selection-based requirements links that you create. For more information about requirements filtering, see “Filter Requirements with User Tags”.

### Data Types

char

#### **'StoreDataExternally' - Preference to store requirements links data in external .req file**

false (default) | true

Preference to store requirements links data in external .req file, specified as a logical value. This setting applies to all new models and to existing models that do not yet have requirements links. For more information about storage of requirements links data, see “Requirements Link Storage” and “Specify Storage for Requirements Links”.

### Data Types

logical

#### **'UseActiveXButtons' - Preference to use legacy ActiveX® buttons in Microsoft Office requirements documents**

false (default) | true

Preference to use legacy ActiveX buttons in Microsoft Office requirements documents, specified as a logical value. The default value of this preference is false; requirements links are URL-based by default. ActiveX requirements navigation is supported for backward compatibility. For more information on legacy ActiveX navigation, see “Navigate with Objects Created Using ActiveX in Microsoft Office 2007 and 2010”.

### Data Types

logical

#### **'CustomSettings' - Preference for storing custom settings**

inUse: 0 (default) | structure array of custom field names and settings

Preference for storing custom settings, specified as a structure array. Each field of the structure array corresponds to the name of your

custom preference, and each associated value corresponds to the value of that custom preference.

## Data Types

struct

## Output Arguments

### **currentVal** - Current value of the RMI preference specified by **prefName**

true | false | 'absolute' | 'none' | ...

Current value of the RMI preference specified by **prefName**. RMI preference names and their associated possible values are listed in “Name-Value Pair Arguments” on page 1-163.

### **previousVal** - Previous value of the RMI preference specified by **prefName**

true | false | 'absolute' | 'none' | ...

Previous value of the RMI preference specified by **prefName**. RMI preference names and their associated possible values are listed in “Name-Value Pair Arguments” on page 1-163.

## Examples

### **References to Simulink Model in External Requirements Documents**

Choose the type of reference that the RMI uses when it creates links to your model from external requirements documents. The reference to your model can be either the model file name or the full absolute path to the model file.

The value of the 'ModelPathReference' preference determines how the RMI stores references to your model in external requirements documents. To view the current value of this preference, enter the following code at the MATLAB command prompt.

```
currentVal = rmipref('ModelPathReference')
```

The default value of the 'ModelPathReference' preference is 'none'.

```
currentVal =
```

```
none
```

This default value specifies that the RMI uses only the model file name in references to your model that it creates in external requirements documents.

### **Automatic Application of User Tags to Selection-Based Requirements Links**

Configure the RMI to automatically apply a specified list of user tag keywords to new selection-based requirements links that you create.

Specify that the user tags `design` and `reqts` apply to new selection-based requirements links that you create.

```
previousVal = rmipref('SelectionLinkTag', 'design, reqts')
```

When you specify a new value for an RMI preference, `rmipref` returns the previous value of that RMI preference. In this case, `previousVal` is an empty string, the default value of the `'SelectionLinkTag'` preference.

```
previousVal =
```

```
''
```

View the currently specified value for the `'SelectionLinkTag'` preference.

```
currentVal = rmipref('SelectionLinkTag')
```

The function returns the currently specified comma-separated list of user tags.

```
currentVal =
```

```
design, reqts
```

These user tags apply to all new selection-based requirements links that you create.

## **External Storage of Requirements Traceability Data**

Configure the RMI to store requirements links data in a separate .req file, instead of embedded in the model file.

---

**Note** If you have existing requirements links for your model that are stored internally, you need to move these links into an external .req file before you change the storage settings for your requirements traceability data. See “Move Internally Stored Requirements Links to External Storage” for more information.

---

If you would like to store requirements traceability data in a separate .req file, set the 'StoreDataExternally' preference to 1.

```
previousVal = rmipref('StoreDataExternally',1)
```

When you specify a new value for an RMI preference, `rmipref` returns the previous value of that RMI preference. By default, the RMI stores requirements links data internally with the model, so the previous value of this preference was 0.

```
previousVal =
```

```
0
```

After you set the 'StoreDataExternally' preference to 1, your requirements links are stored externally, in a separate .req file.

```
currentVal = rmipref('StoreDataExternally')
```

```
currentVal =
```

```
1
```



**See Also**

rmi

**Concepts**

- “Requirements Settings”

# rmiref.insertRefs

---

**Purpose** Insert links to models into requirements documents

**Syntax**

```
[total_links, total_matches,
    total_inserted] = rmiref.insertRefs(model_name,
doc_type)
```

**Description**

```
[total_links, total_matches, total_inserted] =
rmiref.insertRefs(model_name, doc_type)
```

 inserts ActiveX controls into the open, active requirements document of type `doc_type`. These controls correspond to links from `model_name` to the document. With these controls, you can navigate from the requirements document to the model.

**Input Arguments** **model\_name**  
Name or handle of a Simulink model

**doc\_type**  
A string that indicates the requirements document type:

- 'word'
- 'excel'

**Examples** Remove the links in an example requirements document, and then reinsert them:

**1** Open the example model:

```
slvndemo_fuelsys_officereq
```

**2** Open the example requirements document:

```
open([matlabroot strcat('/toolbox/slvnv/rmidemos/fuelsys_req_docs/',...
    'slvndemo_FuelSys_DesignDescription.docx')])
```

**3** Remove the links from the requirements document:

```
rmiref.removeRefs('word')
```

**4** Enter `y` to confirm the removal.

**5** Reinsert the links from the requirements document to the model:

```
[total_links, total_matches, total_inserted] = ...  
rmiref.insertRefs(gcs, 'word')
```

## See Also

`rmiref.removeRefs`

# rmiref.removeRefs

---

**Purpose** Remove links to models from requirements documents

**Syntax** `rmiref.removeRefs(doc_type)`

**Description** `rmiref.removeRefs(doc_type)` removes all links to models from the open, active requirements document of type `doc_type`.

**Input Arguments** **doc\_type**  
A string that indicates the requirements document type:

- 'word'
- 'excel'
- 'doors'

**Examples** Remove the links in this example requirements document:

```
open([matlabroot strcat('/toolbox/slvnv/rmidemos/fuelsys_req_docs/', ...
    'slvnvdemo_FuelSys_DesignDescription.docx')])
rmiref.removeRefs('word')
```

**See Also** `rmiref.insertRefs`

**Purpose**

Manage user tags for requirements links

**Syntax**

```
rmitag(model, 'list')
rmitag(model, 'add', tag)
rmitag(model, 'add', tag, doc_pattern)
rmitag(model, 'delete', tag)
rmitag(model, 'delete', tag, doc_pattern)
rmitag(model, 'replace', tag, new_tag)
rmitag(model, 'replace', tag, new_tag, doc_pattern)
rmitag(model, 'clear', tag)
rmitag(model, 'clear', tag, doc_pattern)
```

**Description**

`rmitag(model, 'list')` lists all user tags in `model`.

`rmitag(model, 'add', tag)` adds a string `tag` as a user tag for all requirements links in `model`.

`rmitag(model, 'add', tag, doc_pattern)` adds `tag` as a user tag for all links in `model`, where the full or partial document name matches the regular expression `doc_pattern`.

`rmitag(model, 'delete', tag)` removes the user tag, `tag` from all requirements links in `model`.

`rmitag(model, 'delete', tag, doc_pattern)` removes the user tag, `tag`, from all requirements links in `model`, where the full or partial document name matches `doc_pattern`.

`rmitag(model, 'replace', tag, new_tag)` replaces `tag` with `new_tag` for all requirements links in `model`.

`rmitag(model, 'replace', tag, new_tag, doc_pattern)` replaces `tag` with `new_tag` for links in `model`, where the full or partial document name matches the regular expression `doc_pattern`.

`rmitag(model, 'clear', tag)` deletes all requirements links that have the user tag, `tag`.

`rmitag(model, 'clear', tag, doc_pattern)` deletes all requirements links that have the user tag, `tag`, and link to the full or partial document name specified in `doc_pattern`.

# rmitag

---

## Input Arguments

### **model**

Name of or handle to Simulink or Stateflow model with which requirements are associated.

### **tag**

String specifying user tag for requirements links.

### **doc\_pattern**

Regular expression to match in the linked requirements document name. Not case sensitive.

### **new\_tag**

String that indicates the name of a user tag for a requirements link. Use this argument when replacing an existing user tag with a new user tag.

## Examples

Open the `slvndemo_fuelsys_officereq` example model, and add the user tag `tmptag` to all objects with requirements links:

```
open_system('slvndemo_fuelsys_officereq');  
rmitag(gcs, 'add', 'tmptag');
```

---

Remove the user tag `test` from all requirements links:

```
open_system('slvndemo_fuelsys_officereq');  
rmitag(gcs, 'delete', 'test');
```

---

Delete all requirements links that have the user tag `design`:

```
open_system('slvndemo_fuelsys_officereq');  
rmitag(gcs, 'clear', 'design');
```

---

Change all instances of the user tag `tmptag` to `safety requirement`, where the document filename extension is `.docx`:

```
open_system('slvnvdemo_fuelsys_officereq');
rmitag(gcs, 'replace', 'tmptag', ...
       'safety requirements', '\.docx');
```

**See Also**

`rmi` | `rmidocrename`

**How To**

- “User Tags and Requirements Filtering”

# RptgenRMI.doorsAttribs

---

**Purpose** IBM Rational DOORS attributes in requirements report

**Syntax** RptgenRMI.doorsAttribs (action,attribute)

**Description** RptgenRMI.doorsAttribs (action,attribute) specifies which DOORS object attributes to include in the generated requirements report.

**Input Arguments** **action**  
String that specifies the desired action for what content to include from a DOORS record in the generated requirements report. Valid values for this argument are as follows.

| Value     | Description                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 'default' | Restore the default settings for the DOORS system attributes to include in the report.<br><br>The default configuration includes the <b>Object Heading</b> and <b>Object Text</b> attributes, and all other attributes, except: <ul style="list-style-type: none"><li>• <b>Created Thru</b></li><li>• System attributes with empty string values</li><li>• System attributes that are false</li></ul> |
| 'show'    | Display the current settings for the DOORS attributes to include in the report.                                                                                                                                                                                                                                                                                                                       |



| Value      | Description                                                                                                                                                                                                                                                                                                                                                                                             |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 'type'     | <p>Include or omit groups of DOORS attributes from the report.</p> <p>If you specify 'type' for the first argument, valid values for the second argument are:</p> <ul style="list-style-type: none"><li>• 'all' — Include all DOORS attributes in the report.</li><li>• 'user' — Include only user-defined DOORS in the report.</li><li>• 'none' — Omit all DOORS attributes from the report.</li></ul> |
| 'remove'   | <p>Omit specified DOORS attributes from the report.</p>                                                                                                                                                                                                                                                                                                                                                 |
| 'all'      | <p>Include specified DOORS attributes in the report, even if that attribute is currently excluded as part of a group.</p>                                                                                                                                                                                                                                                                               |
| 'nonempty' | <p>Enable or disable the empty attribute filter:</p> <ul style="list-style-type: none"><li>• Enter <code>RptgenRMI.doorsAttribs('nonempty', 'off')</code> to omit all empty attributes from the report.</li><li>• Enter <code>RptgenRMI.doorsAttribs('nonempty', 'on')</code> to include empty user-defined attributes. The report never includes empty system attributes.</li></ul>                    |

## attribute

String that qualifies the `action` argument.

# RptgenRMI.doorsAttribs

---

## Output Arguments

### result

- True if RptgenRMI.doorsAttribs modifies the current settings.
- For RptgenRMI.doorsAttribs('show'), this argument is a cell array of strings that indicate which DOORS attributes to include in the requirements report, for example:

```
>> RptgenRMI.doorsAttribs('show')
```

```
ans =
```

```
    'Object Heading'  
    'Object Text'  
    '$AllAttributes$'  
    '$NonEmpty$'  
    '-Created Thru'
```

- The **Object Heading** and **Object Text** attributes are included by default.
- '\$AllAttributes\$' specifies to include all attributes associated with each DOORS object.
- '\$Nonempty\$' specifies to exclude all empty attributes.
- '-Created Thru' specifies to exclude the **Created Thru** attribute for each DOORS object.

## Examples

Limit the DOORS attributes in the requirements report to user-defined attributes:

```
RptgenRMI.doorsAttribs('type', 'user');
```

---

Omit the content of the **Last Modified By** attribute from the requirements report:

```
RptgenRMI.doorsAttribs('remove', 'Last Modified By');
```

---

Include the content of the **Last Modified On** attribute in the requirements report, even if system attributes are not included as a group:

```
RptgenRMI.doorsAttribs('add', 'Last Modified On');
```

---

Include empty system attributes in the requirements report:

```
RptgenRMI.doorsAttribs('nonempty', 'off');
```

---

Omit the **Object Heading** attribute from the requirements report. Use this option when the link label is always the same as the **Object Heading** for the target DOORS object and you do not want duplicate information in the requirements report:

```
RptgenRMI.doorsAttribs('remove', 'Object Heading');
```

## See Also

rmi

# ModelAdvisor.Check.setAction

---

|                    |                                                                                                                                                                                                                                  |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Specify action for check                                                                                                                                                                                                         |
| <b>Syntax</b>      | <code>setAction(check_obj, action_obj)</code>                                                                                                                                                                                    |
| <b>Description</b> | <code>setAction(check_obj, action_obj)</code> returns the action object <code>action_obj</code> to use in the check <code>check_obj</code> . The <code>setAction</code> method identifies the action you want to use in a check. |
| <b>See Also</b>    | <code>ModelAdvisor.Action</code>   “Model Advisor Customization”                                                                                                                                                                 |
| <b>How To</b>      | <ul style="list-style-type: none"><li>• “Authoring Checks”</li></ul>                                                                                                                                                             |

|                    |                                                                                                                                                                                                           |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Specify paragraph alignment                                                                                                                                                                               |
| <b>Syntax</b>      | <code>setAlign(paragraph, alignment)</code>                                                                                                                                                               |
| <b>Description</b> | <code>setAlign(paragraph, alignment)</code> specifies the alignment of text. Possible values are: <ul style="list-style-type: none"><li>• 'left' (default)</li><li>• 'right'</li><li>• 'center'</li></ul> |
| <b>Examples</b>    | <pre>report_paragraph = ModelAdvisor.Paragraph; setAlign(report_paragraph, 'center');</pre>                                                                                                               |
| <b>See Also</b>    | “Model Advisor Customization”                                                                                                                                                                             |
| <b>How To</b>      | • “Authoring Checks”                                                                                                                                                                                      |

# ModelAdvisor.Text.setBold

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                            |                   |                                                           |                   |                                                                                                                                                                                                                             |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Specify bold text                                                                                                                                                                                                                                                                                                                                                                          |                   |                                                           |                   |                                                                                                                                                                                                                             |
| <b>Syntax</b>          | <code>setBold(text, mode)</code>                                                                                                                                                                                                                                                                                                                                                           |                   |                                                           |                   |                                                                                                                                                                                                                             |
| <b>Description</b>     | <code>setBold(text, mode)</code> specifies whether text should be formatted in bold font.                                                                                                                                                                                                                                                                                                  |                   |                                                           |                   |                                                                                                                                                                                                                             |
| <b>Input Arguments</b> | <table><tr><td><code>text</code></td><td>Instantiation of the <code>ModelAdvisor.Text</code> class</td></tr><tr><td><code>mode</code></td><td>A Boolean value indicating bold formatting of text:<ul style="list-style-type: none"><li>• <code>true</code> — Format the text in bold font.</li><li>• <code>false</code> — Do not format the text in bold font.</li></ul></td></tr></table> | <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class | <code>mode</code> | A Boolean value indicating bold formatting of text: <ul style="list-style-type: none"><li>• <code>true</code> — Format the text in bold font.</li><li>• <code>false</code> — Do not format the text in bold font.</li></ul> |
| <code>text</code>      | Instantiation of the <code>ModelAdvisor.Text</code> class                                                                                                                                                                                                                                                                                                                                  |                   |                                                           |                   |                                                                                                                                                                                                                             |
| <code>mode</code>      | A Boolean value indicating bold formatting of text: <ul style="list-style-type: none"><li>• <code>true</code> — Format the text in bold font.</li><li>• <code>false</code> — Do not format the text in bold font.</li></ul>                                                                                                                                                                |                   |                                                           |                   |                                                                                                                                                                                                                             |
| <b>Examples</b>        | <pre>t1 = ModelAdvisor.Text('This is some text'); setBold(t1, 'true');</pre>                                                                                                                                                                                                                                                                                                               |                   |                                                           |                   |                                                                                                                                                                                                                             |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                                                                                                                                                                                                              |                   |                                                           |                   |                                                                                                                                                                                                                             |
| <b>How To</b>          | • “Authoring Checks”                                                                                                                                                                                                                                                                                                                                                                       |                   |                                                           |                   |                                                                                                                                                                                                                             |

**Purpose** Specify action callback function

**Syntax** setCallbackFcn(action\_obj, @handle)

**Description** setCallbackFcn(action\_obj, @handle) specifies the handle to the callback function, handle, to use with the action object, action\_obj.

## Examples

---

**Note** The following example is a fragment of code from the sl\_customization.m file for the example model, slvndemo\_mdadv. The example does not execute as shown without the additional content found in the sl\_customization.m file.

---

```
rec = ModelAdvisor.Check('mathworks.example.optimizationSettings');
% Define an automatic fix action for this check
modifyAction = ModelAdvisor.Action;
modifyAction.setCallbackFcn(@modifyOptimizationSetting);
modifyAction.Name = 'Modify Settings';
modifyAction.Description = ['Modify model configuration optimization' ...
    ' settings that can impact safety'];
modifyAction.Enable = true;
rec.setAction(modifyAction);
```

**See Also** “Model Advisor Customization”

**How To**

- “Define Check Actions”
- “Authoring Checks”
- “setActionEnable”

# ModelAdvisor.Check.setCallbackFcn

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                                                            |                     |                                     |                      |                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                                                                                    |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------------------|---------------------|-------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Specify callback function for check                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |                                                            |                     |                                     |                      |                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                                                                                    |
| <b>Syntax</b>          | <code>setCallbackFcn(check_obj, @handle, context, style)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                                                            |                     |                                     |                      |                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>     | <code>setCallbackFcn(check_obj, @handle, context, style)</code> specifies the callback function to use with the check, <code>check_obj</code> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                                                            |                     |                                     |                      |                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                                                                                    |
| <b>Input Arguments</b> | <table><tr><td><code>check_obj</code></td><td>Instantiation of the <code>ModelAdvisor.Check</code> class</td></tr><tr><td><code>handle</code></td><td>Handle to a check callback function</td></tr><tr><td><code>context</code></td><td>Context for checking the model or subsystem:<ul style="list-style-type: none"><li>• 'None' — No special requirements.</li><li>• 'PostCompile' — The model must be compiled.</li></ul></td></tr><tr><td><code>style</code></td><td>Type of callback function:<ul style="list-style-type: none"><li>• 'StyleOne' — Simple check callback function, for formatting results using template</li><li>• 'StyleTwo' — Detailed check callback function</li><li>• 'StyleThree' — Check callback functions with hyperlinked results</li></ul></td></tr></table> | <code>check_obj</code> | Instantiation of the <code>ModelAdvisor.Check</code> class | <code>handle</code> | Handle to a check callback function | <code>context</code> | Context for checking the model or subsystem: <ul style="list-style-type: none"><li>• 'None' — No special requirements.</li><li>• 'PostCompile' — The model must be compiled.</li></ul> | <code>style</code> | Type of callback function: <ul style="list-style-type: none"><li>• 'StyleOne' — Simple check callback function, for formatting results using template</li><li>• 'StyleTwo' — Detailed check callback function</li><li>• 'StyleThree' — Check callback functions with hyperlinked results</li></ul> |
| <code>check_obj</code> | Instantiation of the <code>ModelAdvisor.Check</code> class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |                                                            |                     |                                     |                      |                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                                                                                    |
| <code>handle</code>    | Handle to a check callback function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |                                                            |                     |                                     |                      |                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                                                                                    |
| <code>context</code>   | Context for checking the model or subsystem: <ul style="list-style-type: none"><li>• 'None' — No special requirements.</li><li>• 'PostCompile' — The model must be compiled.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                        |                                                            |                     |                                     |                      |                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                                                                                    |
| <code>style</code>     | Type of callback function: <ul style="list-style-type: none"><li>• 'StyleOne' — Simple check callback function, for formatting results using template</li><li>• 'StyleTwo' — Detailed check callback function</li><li>• 'StyleThree' — Check callback functions with hyperlinked results</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                        |                                                            |                     |                                     |                      |                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                                                                                    |

## Examples

```
% --- sample check 1
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');
rec.Title = 'Check Simulink block font';
rec.TitleTips = 'Example style three callback';
rec.setCallbackFcn(@SampleStyleThreeCallback, 'None', 'StyleThree');
```

## See Also

“Model Advisor Customization”



## How To

- “Create Callback Functions and Results”
- “Authoring Checks”

# ModelAdvisor.Task.setCheck

---

**Purpose** Specify check used in task

**Syntax** `setCheck(task, check_ID)`

**Description** `setCheck(task, check_ID)` specifies the check to use in the task. You can use one `ModelAdvisor.Check` object in multiple `ModelAdvisor.Task` objects, allowing you to place the same check in multiple locations in the Model Advisor tree. For example, **Check for implicit signal resolution** appears in the **By Product > Simulink folder** and in the **By Task > Model Referencing** folder in the Model Advisor tree. When adding checks as tasks, the Model Advisor uses the task properties instead of the check properties, except for `Visible` and `LicenseName`.

|                        |                       |                                                              |
|------------------------|-----------------------|--------------------------------------------------------------|
| <b>Input Arguments</b> | <code>task</code>     | Instantiation of the <code>ModelAdvisor.Task</code> class    |
|                        | <code>check_ID</code> | A unique string that identifies the check to use in the task |

**Examples**

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');
setCheck(MAT1, 'com.mathworks.sample.Check1');
```

# ModelAdvisor.FormatTemplate.setCheckText

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Add description of check to result                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax</b>          | <code>setCheckText(<i>ft_obj</i>, <i>text</i>)</code>                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>     | <code>setCheckText(<i>ft_obj</i>, <i>text</i>)</code> is an optional method that adds text or a model advisor template object as the first item in the report. Use this method to add information describing the overall check.                                                                                                                                                                                                                 |
| <b>Input Arguments</b> | <p><b>ft_obj</b><br/>A handle to a template object.</p> <p><b>text</b><br/>A string or a handle to a formatting object.<br/>Valid formatting objects are: <code>ModelAdvisor.Image</code>, <code>ModelAdvisor.LineBreak</code>, <code>ModelAdvisor.List</code>, <code>ModelAdvisor.Paragraph</code>, <code>ModelAdvisor.Table</code>, and <code>ModelAdvisor.Text</code>.<br/><i>text</i> appears as the first line in the analysis result.</p> |
| <b>Examples</b>        | <p>Create a list object, <code>ft</code>, and add a line of text to the result:</p> <pre>ft = ModelAdvisor.FormatTemplate('ListTemplate'); setCheckText(ft, ['Identify unconnected lines, input ports,...     'and output ports in the model']);</pre>                                                                                                                                                                                          |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>How To</b>          | <ul style="list-style-type: none"><li>• “Authoring Checks”</li><li>• “Format Model Advisor Results”</li></ul>                                                                                                                                                                                                                                                                                                                                   |

# ModelAdvisor.Table.setColHeading

---

**Purpose** Specify table column title

**Syntax** `setColHeading(table, column, heading)`

**Description** `setColHeading(table, column, heading)` specifies that the column header of column is set to heading.

|                        |                      |                                                                             |
|------------------------|----------------------|-----------------------------------------------------------------------------|
| <b>Input Arguments</b> | <code>table</code>   | Instantiation of the <code>ModelAdvisor.Table</code> class                  |
|                        | <code>column</code>  | An integer specifying the column number                                     |
|                        | <code>heading</code> | A string, element object, or object array specifying the table column title |

**Examples**

```
table1 = ModelAdvisor.Table(2, 3);
setColHeading(table1, 1, 'Header 1');
setColHeading(table1, 2, 'Header 2');
setColHeading(table1, 3, 'Header 3');
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Table.setColHeadingAlign

---

**Purpose** Specify column title alignment

**Syntax** `setColHeadingAlign(table, column, alignment)`

**Description** `setColHeadingAlign(table, column, alignment)` specifies the alignment of the column heading.

## Input Arguments

|                               |                                                                                                                                                                                           |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>table</code>            | Instantiation of the <code>ModelAdvisor.Table</code> class                                                                                                                                |
| <code>column</code>           | An integer specifying the column number                                                                                                                                                   |
| <code><i>alignment</i></code> | Alignment of the column heading. <i>alignment</i> can have one of the following values: <ul style="list-style-type: none"><li>• left (default)</li><li>• right</li><li>• center</li></ul> |

## Examples

```
table1 = ModelAdvisor.Table(2, 3);
setColHeading(table1, 1, 'Header 1');
setColHeadingAlign(table1, 1, 'center');
setColHeading(table1, 2, 'Header 2');
setColHeadingAlign(table1, 2, 'center');
setColHeading(table1, 3, 'Header 3');
setColHeadingAlign(table1, 3, 'center');
```

**See Also** “Model Advisor Customization”

**How To** • “Authoring Checks”

# ModelAdvisor.Table.setColHeadingValign

---

**Purpose** Specify column title vertical alignment

**Syntax** `setColHeadingValign(table, column, alignment)`

**Description** `setColHeadingValign(table, column, alignment)` specifies the vertical alignment of the column heading.

**Input Arguments**

|                               |                                                                                                                                                                                                    |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>table</code>            | Instantiation of the <code>ModelAdvisor.Table</code> class                                                                                                                                         |
| <code>column</code>           | An integer specifying the column number                                                                                                                                                            |
| <code><i>alignment</i></code> | Vertical alignment of the column heading. <i>alignment</i> can have one of the following values: <ul style="list-style-type: none"><li>• top (default)</li><li>• middle</li><li>• bottom</li></ul> |

**Examples**

```
table1 = ModelAdvisor.Table(2, 3);
setColHeading(table1, 1, 'Header 1');
setColHeadingValign(table1, 1, 'middle');
setColHeading(table1, 2, 'Header 2');
setColHeadingValign(table1, 2, 'middle');
setColHeading(table1, 3, 'Header 3');
setColHeadingValign(table1, 3, 'middle');
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”

**Purpose** Specify text color

**Syntax** `setColor(text, color)`

**Description** `setColor(text, color)` sets the text color to *color*.

**Input Arguments**

*text*

Instantiation of the `ModelAdvisor.Text` class

*color*

An enumerated string specifying the color of the text. Possible formatting options include:

- `normal` (default) — Text is default color.
- `pass` — Text is green.
- `warn` — Text is yellow.
- `fail` — Text is red.
- `keyword` — Text is blue.

**Examples**

```
t1 = ModelAdvisor.Text('This is a warning');  
setColor(t1, 'warn');
```

# ModelAdvisor.InputParameter.setColSpan

---

**Purpose** Specify number of columns for input parameter

**Syntax** `setColSpan(input_param, [start_col end_col])`

**Description** `setColSpan(input_param, [start_col end_col])` specifies the number of columns that the parameter occupies. Use the `setColSpan` method to specify where you want an input parameter located in the layout grid when there are multiple input parameters.

|                        |                          |                                                                                                       |
|------------------------|--------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Input Arguments</b> | <code>input_param</code> | Instantiation of the <code>ModelAdvisor.InputParameter</code> class                                   |
|                        | <code>start_col</code>   | A positive integer representing the first column that the input parameter occupies in the layout grid |
|                        | <code>end_col</code>     | A positive integer representing the last column that the input parameter occupies in the layout grid  |

**Examples**

```
inputParam2 = ModelAdvisor.InputParameter;  
inputParam2.Name = 'Standard font size';  
inputParam2.Value='12';  
inputParam2.Type='String';  
inputParam2.Description='sample tooltip';  
inputParam2.setRowSpan([2 2]);  
inputParam2.setColSpan([1 1]);
```



# ModelAdvisor.FormatTemplate.setColTitles

---

## Purpose

Add column titles to table

## Syntax

```
setColTitles(ft_obj, {col_title_1, col_title_2, ...})
```

## Description

`setColTitles(ft_obj, {col_title_1, col_title_2, ...})` is method you must use when you create a template object that is a table type. Use it to specify the titles of the columns in the table.

---

**Note** Before adding data to a table, you must specify column titles.

---

## Input Arguments

### **ft\_obj**

A handle to a template object.

### **col\_title\_N**

A cell of strings or handles to formatting objects, specifying the column titles.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

The order of the `col_title_N` inputs determines which column the title is in. If you do not add data to the table, the Model Advisor does not display the table in the result.

## Examples

Create a table object, `ft`, and specify two column titles:

```
ft = ModelAdvisor.FormatTemplate('TableTemplate');  
setColTitles(ft, {'Index', 'Block Name'});
```

## See Also

“Model Advisor Customization”

## How To

- “Authoring Checks”

# ModelAdvisor.FormatTemplate.setColTitles

---

- “Format Model Advisor Results”

**Purpose** Specify column widths

**Syntax** `setColWidth(table, column, width)`

**Description** `setColWidth(table, column, width)` specifies the column.

The `setColWidth` method specifies the table column widths relative to the entire table width. If column widths are [1 2 3], the second column is twice the width of the first column, and the third column is three times the width of the first column. Unspecified columns have a default width of 1. For example:

```
setColWidth(1, 1);  
setColWidth(3, 2);
```

specifies [1 1 2] column widths.

## Input Arguments

|                     |                                                                                                  |
|---------------------|--------------------------------------------------------------------------------------------------|
| <code>table</code>  | Instantiation of the <code>ModelAdvisor.Table</code> class                                       |
| <code>column</code> | An integer specifying column number                                                              |
| <code>width</code>  | An integer or array of integers specifying the column widths, relative to the entire table width |

## Examples

```
table1 = ModelAdvisor.Table(2, 3)  
setColWidth(table1, 1, 1);  
setColWidth(table1, 3, 2);
```

**See Also** “Model Advisor Customization”

**How To** • “Authoring Checks”

# ModelAdvisor.Table.setEntries

---

**Purpose** Set contents of table

**Syntax** setEntries(content)

**Description** setEntries(content)

**Input Arguments**

|         |                                                                                                                                                                                                                                                                       |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| content | A 2-D cell array containing the contents of the table. Each item of the cell array must be either a string or an instance of ModelAdvisor.Element. The size of the cell array must be equal to the size of the table specified in the ModelAdvisor.Table constructor. |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Examples

```
table = ModelAdvisor.Table(4,3);
contents = cell(4,3); % 4 by 3 table
for k=1:4
    for m=1:3
        contents{k,m} = ['Contents for row-' num2str(k) ' column-' num2str(m)];
    end
end
table.setEntries(contents);
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”

**Purpose**

Add cell to table

**Syntax**

```
setEntry(table, row, column, string)
setEntry(table, row, column, content)
```

**Description**

setEntry(table, row, column, string) adds a string to a cell in a table.

setEntry(table, row, column, content) adds an object specified by content to a cell in a table.

**Input Arguments**

|         |                                                                               |
|---------|-------------------------------------------------------------------------------|
| table   | Instantiation of the ModelAdvisor.Table class                                 |
| row     | An integer specifying the row                                                 |
| column  | An integer specifying the column                                              |
| string  | A string representing the contents of the entry                               |
| content | An element object or object array specifying the content of the table entries |

**Examples**

Create two tables and insert table2 into the first cell of table1:

```
table1 = ModelAdvisor.Table(1, 1);
table2 = ModelAdvisor.Table(2, 3);
.
.
.
setEntry(table1, 1, 1, table2);
```

**See Also**

“Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Table.setEntryAlign

---

**Purpose** Specify table cell alignment

**Syntax** `setEntryAlign(table, row, column, alignment)`

**Description** `setEntryAlign(table, row, column, alignment)` specifies the cell alignment of the designated cell.

**Input Arguments**

|                               |                                                                                                                                                                                                       |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>table</code>            | Instantiation of the <code>ModelAdvisor.Table</code> class                                                                                                                                            |
| <code>row</code>              | An integer specifying row number                                                                                                                                                                      |
| <code>column</code>           | An integer specifying column number                                                                                                                                                                   |
| <code><i>alignment</i></code> | A string specifying the cell alignment. Possible values are: <ul style="list-style-type: none"><li>• <code>left</code> (default)</li><li>• <code>right</code></li><li>• <code>center</code></li></ul> |

**Examples**

```
table1 = ModelAdvisor.Table(2,3);
setHeading(table1, 'New Table');
.
.
.
setEntry(table1, 1, 1, 'First Entry');
setEntryAlign(table1, 1, 1, 'center');
```

**See Also** “Model Advisor Customization”

**How To** • “Authoring Checks”

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------|------------------|----------------------------------|---------------------|-------------------------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>                | Specify table cell vertical alignment                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
| <b>Syntax</b>                 | <code>setEntryValign(table, row, column, <i>alignment</i>)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
| <b>Description</b>            | <code>setEntryValign(table, row, column, <i>alignment</i>)</code> specifies the cell alignment of the designated cell.                                                                                                                                                                                                                                                                                                                                                                                           |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
| <b>Input Arguments</b>        | <table><tr><td><code>table</code></td><td>Instantiation of the <code>ModelAdvisor.Table</code> class</td></tr><tr><td><code>row</code></td><td>An integer specifying row number</td></tr><tr><td><code>column</code></td><td>An integer specifying column number</td></tr><tr><td><code><i>alignment</i></code></td><td>A string specifying the cell vertical alignment. Possible values are:<ul style="list-style-type: none"><li>• top (default)</li><li>• middle</li><li>• bottom</li></ul></td></tr></table> | <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class | <code>row</code> | An integer specifying row number | <code>column</code> | An integer specifying column number | <code><i>alignment</i></code> | A string specifying the cell vertical alignment. Possible values are: <ul style="list-style-type: none"><li>• top (default)</li><li>• middle</li><li>• bottom</li></ul> |
| <code>table</code>            | Instantiation of the <code>ModelAdvisor.Table</code> class                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
| <code>row</code>              | An integer specifying row number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
| <code>column</code>           | An integer specifying column number                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
| <code><i>alignment</i></code> | A string specifying the cell vertical alignment. Possible values are: <ul style="list-style-type: none"><li>• top (default)</li><li>• middle</li><li>• bottom</li></ul>                                                                                                                                                                                                                                                                                                                                          |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
| <b>Examples</b>               | <pre>table1 = ModelAdvisor.Table(2,3); setHeading(table1, 'New Table'); . . . setEntry(table1, 1, 1, 'First Entry'); setEntryValign(table1, 1, 1, 'middle');</pre>                                                                                                                                                                                                                                                                                                                                               |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
| <b>See Also</b>               | “Model Advisor Customization”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |
| <b>How To</b>                 | • “Authoring Checks”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                                                            |                  |                                  |                     |                                     |                               |                                                                                                                                                                         |

# ModelAdvisor.Table.setHeading

---

**Purpose** Specify table title

**Syntax** `setHeading(table, title)`

**Description** `setHeading(table, title)` specifies the table title.

**Input Arguments**

|                    |                                                                          |
|--------------------|--------------------------------------------------------------------------|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class               |
| <code>title</code> | A string, element object, or object array that specifies the table title |

**Examples**

```
table1 = ModelAdvisor.Table(2, 3);  
setHeading(table1, 'New Table');
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”



# ModelAdvisor.Table.setHeadingAlign

---

**Purpose** Specify table title alignment

**Syntax** `setHeadingAlign(table, alignment)`

**Description** `setHeadingAlign(table, alignment)` specifies the alignment for the table title.

**Input Arguments**

|                        |                                                                                                                                                                       |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>table</code>     | Instantiation of the <code>ModelAdvisor.Table</code> class                                                                                                            |
| <code>alignment</code> | A string specifying the table title alignment. Possible values are: <ul style="list-style-type: none"><li>• left (default)</li><li>• right</li><li>• center</li></ul> |

**Examples**

```
table1 = ModelAdvisor.Table(2, 3);
setHeading(table1, 'New Table');
setHeadingAlign(table1, 'center');
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Image.setHyperlink

---

|                        |                                                                                                                                                                                                     |                    |                                                            |                  |                                    |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------|------------------|------------------------------------|
| <b>Purpose</b>         | Specify hyperlink location                                                                                                                                                                          |                    |                                                            |                  |                                    |
| <b>Syntax</b>          | <code>setHyperlink(image, url)</code>                                                                                                                                                               |                    |                                                            |                  |                                    |
| <b>Description</b>     | <code>setHyperlink(image, url)</code> specifies the target location of the hyperlink associated with <code>image</code> .                                                                           |                    |                                                            |                  |                                    |
| <b>Input Arguments</b> | <table><tr><td><code>image</code></td><td>Instantiation of the <code>ModelAdvisor.Image</code> class</td></tr><tr><td><code>url</code></td><td>A string specifying the target URL</td></tr></table> | <code>image</code> | Instantiation of the <code>ModelAdvisor.Image</code> class | <code>url</code> | A string specifying the target URL |
| <code>image</code>     | Instantiation of the <code>ModelAdvisor.Image</code> class                                                                                                                                          |                    |                                                            |                  |                                    |
| <code>url</code>       | A string specifying the target URL                                                                                                                                                                  |                    |                                                            |                  |                                    |
| <b>Examples</b>        | <pre>matlab_logo=ModelAdvisor.Image;<br/>setHyperlink(matlab_logo, 'http://www.mathworks.com');</pre>                                                                                               |                    |                                                            |                  |                                    |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                       |                    |                                                            |                  |                                    |
| <b>How To</b>          | <ul style="list-style-type: none"><li>• “Authoring Checks”</li></ul>                                                                                                                                |                    |                                                            |                  |                                    |

**Purpose** Specify hyperlinked text

**Syntax** `setHyperlink(text, url)`

**Description** `setHyperlink(text, url)` creates a hyperlink from the text to the specified URL.

**Input Arguments**

|                   |                                                           |
|-------------------|-----------------------------------------------------------|
| <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class |
| <code>url</code>  | A string that specifies the target location of the URL    |

**Examples**

```
t1 = ModelAdvisor.Text('MathWorks home page');
setHyperlink(t1, 'http://www.mathworks.com');
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Image.setImageSource

---

**Purpose** Specify image location

**Syntax** `setImageSource(image_obj, source)`

**Description** `setImageSource(image_obj, source)` specifies the location of the image.

|                        |                        |                                                            |
|------------------------|------------------------|------------------------------------------------------------|
| <b>Input Arguments</b> | <code>image_obj</code> | Instantiation of the <code>ModelAdvisor.Image</code> class |
|                        | <code>source</code>    | A string specifying the location of the image file         |

**See Also** “Model Advisor Customization”

**How To** • “Authoring Checks”

# ModelAdvisor.FormatTemplate.setInformation

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Add description of subcheck to result                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>          | <code>setInformation(<i>ft_obj</i>, <i>text</i>)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>     | <code>setInformation(<i>ft_obj</i>, <i>text</i>)</code> is an optional method that adds <i>text</i> as the first item after the subcheck title. Use this method to add information describing the subcheck.                                                                                                                                                                                                                                                                                      |
| <b>Input Arguments</b> | <p><b>ft_obj</b><br/>A handle to a template object.</p> <p><b>text</b><br/>A string or a handle to a formatting object, that describes the subcheck.<br/><br/>Valid formatting objects are: <code>ModelAdvisor.Image</code>, <code>ModelAdvisor.LineBreak</code>, <code>ModelAdvisor.List</code>, <code>ModelAdvisor.Paragraph</code>, <code>ModelAdvisor.Table</code>, and <code>ModelAdvisor.Text</code>.<br/><br/>The Model Advisor displays <i>text</i> after the title of the subcheck.</p> |
| <b>Examples</b>        | <p>Create a list object, <i>ft</i>, and specify a subcheck title and description:</p> <pre>ft = ModelAdvisor.FormatTemplate('ListTemplate'); setSubTitle(ft, ['Check for constructs in the model '...     'that are not supported when generating code']); setInformation(ft, ['Identify blocks that should not '...     'be used for code generation.']);</pre>                                                                                                                                 |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>How To</b>          | <ul style="list-style-type: none"><li>• “Authoring Checks”</li><li>• “Format Model Advisor Results”</li></ul>                                                                                                                                                                                                                                                                                                                                                                                    |

# ModelAdvisor.Check.setInputParameters

---

**Purpose** Specify input parameters for check

**Syntax** setInputParameters(check\_obj, params)

**Description** setInputParameters(check\_obj, params) specifies ModelAdvisor.InputParameter objects (params) to be used as input parameters to a check (check\_obj).

|                        |           |                                                      |
|------------------------|-----------|------------------------------------------------------|
| <b>Input Arguments</b> | check_obj | Instantiation of the ModelAdvisor.Check class        |
|                        | params    | A cell array of ModelAdvisor.InputParameters objects |

**Examples**

```
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');
inputParam1 = ModelAdvisor.InputParameter;
inputParam2 = ModelAdvisor.InputParameter;
inputParam3 = ModelAdvisor.InputParameter;
setInputParameters(rec, {inputParam1,inputParam2,inputParam3});
```

**See Also** ModelAdvisor.InputParameter | “Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Check.setInputParametersLayoutGrid

---

**Purpose** Specify layout grid for input parameters

**Syntax** `setInputParametersLayoutGrid(check_obj, [row col])`

**Description** `setInputParametersLayoutGrid(check_obj, [row col])` specifies the layout grid for input parameters in the Model Advisor. Use the `setInputParametersLayoutGrid` method when there are multiple input parameters.

|                        |                        |                                                            |
|------------------------|------------------------|------------------------------------------------------------|
| <b>Input Arguments</b> | <code>check_obj</code> | Instantiation of the <code>ModelAdvisor.Check</code> class |
|                        | <code>row</code>       | Number of rows in the layout grid                          |
|                        | <code>col</code>       | Number of columns in the layout grid                       |

**Examples**

```
% --- sample check 1
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');
rec.Title = 'Check Simulink block font';
rec.TitleTips = 'Example style three callback';
rec.setCallbackFcn(@SampleStyleThreeCallback, 'None', 'StyleThree');
rec.setInputParametersLayoutGrid([3 2]);
```

**See Also** `ModelAdvisor.InputParameter` | “Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Text.setItalic

---

|                        |                                                                                 |                                                                                                                                                                                                                                                                        |
|------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Italicize text                                                                  |                                                                                                                                                                                                                                                                        |
| <b>Syntax</b>          | <code>setItalic(text, mode)</code>                                              |                                                                                                                                                                                                                                                                        |
| <b>Description</b>     | <code>setItalic(text, mode)</code> specifies whether text should be italicized. |                                                                                                                                                                                                                                                                        |
| <b>Input Arguments</b> | <code>text</code><br><code>mode</code>                                          | Instantiation of the <code>ModelAdvisor.Text</code> class<br>A Boolean value indicating italic formatting of text: <ul style="list-style-type: none"><li>• <code>true</code> — Italicize the text.</li><li>• <code>false</code> — Do not italicize the text.</li></ul> |
| <b>Examples</b>        | <pre>t1 = ModelAdvisor.Text('This is some text'); setItalic(t1, 'true');</pre>  |                                                                                                                                                                                                                                                                        |
| <b>See Also</b>        | “Model Advisor Customization”                                                   |                                                                                                                                                                                                                                                                        |
| <b>How To</b>          | • “Authoring Checks”                                                            |                                                                                                                                                                                                                                                                        |



**Purpose** Add list of hyperlinks to model objects

**Syntax** `setListObj(ft_obj, {model_obj})`

**Description** `setListObj(ft_obj, {model_obj})` is an optional method that generates a bulleted list of hyperlinks to model objects. *ft\_obj* is a handle to a list template object. *model\_obj* is a cell array of handles or full paths to blocks, or model objects that the Model Advisor displays as a bulleted list of hyperlinks in the report.

**Examples** Create a list object, `ft`, and add a list of the blocks found in the model:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');

% Find all the blocks in the system
allBlocks = find_system(system);

% Add the blocks to a list
setListObj(ft, allBlocks);
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”
- “Format Model Advisor Results”

# ModelAdvisor.FormatTemplate.setRecAction

---

**Purpose** Add Recommended Action section and text

**Syntax** `setRecAction(ft_obj, {text})`

**Description** `setRecAction(ft_obj, {text})` is an optional method that adds a Recommended Action section to the report. Use this method to describe how to fix the check.

**Input Arguments**

**ft\_obj**

A handle to a template object.

**text**

A cell array of strings or handles to formatting objects, that describes the recommended action to fix the issues reported by the check.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

The Model Advisor displays the recommended action as a separate section below the list or table in the report.

**Examples**

Create a list object, ft, find Gain blocks in the model, and recommend changing them:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
% Find all Gain blocks
gainBlocks = find_system(gcs, 'BlockType','Gain');

% Find Gain blocks
for idx = 1:length(gainBlocks)
    gainObj = get_param(gainBlocks(idx), 'Object');

    setRecAction(ft, {'If you are using these blocks '...
    'as buffers, you should replace them with '...

```

```
'Signal Conversion blocks'}});  
end
```

## See Also

“Model Advisor Customization”

## How To

- “Authoring Checks”
- “Format Model Advisor Results”

# ModelAdvisor.FormatTemplate.setRefLink

---

**Purpose** Add See Also section and links

**Syntax**  
`setRefLink(ft_obj, {'standard'})`  
`setRefLink(ft_obj, {'url', 'standard'})`

**Description** `setRefLink(ft_obj, {'standard'})` is an optional method that adds a See Also section above the table or list in the result. Use this method to add references to standards. `ft_obj` is a handle to a template object. `standard` is a cell array of strings that you want to display in the result. If you include more than one cell, the Model Advisor displays the strings in a bulleted list.

`setRefLink(ft_obj, {'url', 'standard'})` generates a list of links in the See Also section. `url` is a string that indicates the location to link to. You must provide the full link including the protocol. For example, `http://www.mathworks.com` is a valid link, while `www.mathworks.com` is not a valid link. You can create a link to a protocol that is valid URL, such as a web site address, a full path to a file, or a relative path to a file.

---

**Note** `setRefLink` expects a cell array of cell arrays for the second input.

---

**Examples** Create a list object, `ft`, and add a related standard:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
setRefLink(ft, {'IEC 61508-3, Table A.3 (3) 'Language subset'});
```

Create a list object, `ft`, and add a list of related standards:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
setRefLink(ft, {  
    {'IEC 61508-3, Table A.3 (2) 'Strongly typed programming language'},...  
    {'IEC 61508-3, Table A.3 (3) 'Language subset'});
```

**See Also** “Model Advisor Customization”

## How To

- “Authoring Checks”
- “Format Model Advisor Results”

# ModelAdvisor.Text.setRetainSpaceReturn

---

|                        |                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Retain spacing and returns in text                                                                                    |                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax</b>          | <code>setRetainSpaceReturn(text, mode)</code>                                                                         |                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>     | <code>setRetainSpaceReturn(text, mode)</code> specifies whether the text must retain the spaces and carriage returns. |                                                                                                                                                                                                                                                                                                                                                        |
| <b>Input Arguments</b> | <code>text</code><br><code>mode</code>                                                                                | Instantiation of the <code>ModelAdvisor.Text</code> class<br>A Boolean value indicating whether to preserve spaces and carriage returns in the text: <ul style="list-style-type: none"><li>• <code>true</code> (default) — Preserve spaces and carriage returns.</li><li>• <code>false</code> — Do not preserve spaces and carriage returns.</li></ul> |
| <b>Examples</b>        | <pre>t1 = ModelAdvisor.Text('MathWorks home page');<br/>setRetainSpaceReturn(t1, 'true');</pre>                       |                                                                                                                                                                                                                                                                                                                                                        |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                         |                                                                                                                                                                                                                                                                                                                                                        |
| <b>How To</b>          | • “Authoring Checks”                                                                                                  |                                                                                                                                                                                                                                                                                                                                                        |

# ModelAdvisor.Table.setRowHeading

---

|                        |                                                                                                                                                                                                                                                                                                                          |                    |                                                            |                  |                                  |                      |                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------|------------------|----------------------------------|----------------------|--------------------------------------------------------------------------|
| <b>Purpose</b>         | Specify table row title                                                                                                                                                                                                                                                                                                  |                    |                                                            |                  |                                  |                      |                                                                          |
| <b>Syntax</b>          | <code>setRowHeading(table, row, heading)</code>                                                                                                                                                                                                                                                                          |                    |                                                            |                  |                                  |                      |                                                                          |
| <b>Description</b>     | <code>setRowHeading(table, row, heading)</code> specifies a title for the designated table row.                                                                                                                                                                                                                          |                    |                                                            |                  |                                  |                      |                                                                          |
| <b>Input Arguments</b> | <table><tr><td><code>table</code></td><td>Instantiation of the <code>ModelAdvisor.Table</code> class</td></tr><tr><td><code>row</code></td><td>An integer specifying row number</td></tr><tr><td><code>heading</code></td><td>A string, element object, or object array specifying the table row title</td></tr></table> | <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class | <code>row</code> | An integer specifying row number | <code>heading</code> | A string, element object, or object array specifying the table row title |
| <code>table</code>     | Instantiation of the <code>ModelAdvisor.Table</code> class                                                                                                                                                                                                                                                               |                    |                                                            |                  |                                  |                      |                                                                          |
| <code>row</code>       | An integer specifying row number                                                                                                                                                                                                                                                                                         |                    |                                                            |                  |                                  |                      |                                                                          |
| <code>heading</code>   | A string, element object, or object array specifying the table row title                                                                                                                                                                                                                                                 |                    |                                                            |                  |                                  |                      |                                                                          |
| <b>Examples</b>        | <pre>table1 = ModelAdvisor.Table(2,3); setRowHeading(table1, 1, 'Row 1 Title'); setRowHeading(table1, 2, 'Row 2 Title');</pre>                                                                                                                                                                                           |                    |                                                            |                  |                                  |                      |                                                                          |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                                                                                                                                            |                    |                                                            |                  |                                  |                      |                                                                          |
| <b>How To</b>          | <ul style="list-style-type: none"><li>• “Authoring Checks”</li></ul>                                                                                                                                                                                                                                                     |                    |                                                            |                  |                                  |                      |                                                                          |

# ModelAdvisor.Table.setRowHeadingAlign

---

**Purpose** Specify table row title alignment

**Syntax** `setRowHeadingAlign(table, row, alignment)`

**Description** `setRowHeadingAlign(table, row, alignment)` specifies the alignment for the designated table row.

**Input Arguments**

|                        |                                                                                                                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>table</code>     | Instantiation of the <code>ModelAdvisor.Table</code> class                                                                                                                                            |
| <code>row</code>       | An integer specifying row number.                                                                                                                                                                     |
| <code>alignment</code> | A string specifying the cell alignment. Possible values are: <ul style="list-style-type: none"><li>• <code>left</code> (default)</li><li>• <code>right</code></li><li>• <code>center</code></li></ul> |

**Examples**

```
table1 = ModelAdvisor.Table(2, 3);
setRowHeading(table1, 1, 'Row 1 Title');
setRowHeadingAlign(table1, 1, 'center');
setRowHeading(table1, 2, 'Row 2 Title');
setRowHeadingAlign(table1, 2, 'center');
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”



# ModelAdvisor.Table.setRowHeadingValign

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------|------------------|-----------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Specify table row title vertical alignment                                                                                                                                                                                                                                                                                                                                                                                |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |
| <b>Syntax</b>          | <code>setRowHeadingValign(table, row, alignment)</code>                                                                                                                                                                                                                                                                                                                                                                   |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |
| <b>Description</b>     | <code>setRowHeadingValign(table, row, alignment)</code> specifies the vertical alignment for the designated table row.                                                                                                                                                                                                                                                                                                    |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |
| <b>Input Arguments</b> | <table><tr><td><code>table</code></td><td>Instantiation of the <code>ModelAdvisor.Table</code> class</td></tr><tr><td><code>row</code></td><td>An integer specifying row number.</td></tr><tr><td><code>alignment</code></td><td>A string specifying the cell vertical alignment. Possible values are:<ul style="list-style-type: none"><li>• top (default)</li><li>• middle</li><li>• bottom</li></ul></td></tr></table> | <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class | <code>row</code> | An integer specifying row number. | <code>alignment</code> | A string specifying the cell vertical alignment. Possible values are: <ul style="list-style-type: none"><li>• top (default)</li><li>• middle</li><li>• bottom</li></ul> |
| <code>table</code>     | Instantiation of the <code>ModelAdvisor.Table</code> class                                                                                                                                                                                                                                                                                                                                                                |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |
| <code>row</code>       | An integer specifying row number.                                                                                                                                                                                                                                                                                                                                                                                         |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |
| <code>alignment</code> | A string specifying the cell vertical alignment. Possible values are: <ul style="list-style-type: none"><li>• top (default)</li><li>• middle</li><li>• bottom</li></ul>                                                                                                                                                                                                                                                   |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |
| <b>Examples</b>        | <pre>table1 = ModelAdvisor.Table(2, 3); setRowHeading(table1, 1, 'Row 1 Title'); setRowHeadingValign(table1, 1, 'middle'); setRowHeading(table1, 2, 'Row 2 Title'); setRowHeadingValign(table1, 2, 'middle');</pre>                                                                                                                                                                                                       |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                                                                                                                                                                                                                                             |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |
| <b>How To</b>          | <ul style="list-style-type: none"><li>• “Authoring Checks”</li></ul>                                                                                                                                                                                                                                                                                                                                                      |                    |                                                            |                  |                                   |                        |                                                                                                                                                                         |

# ModelAdvisor.InputParameter.setRowSpan

---

**Purpose** Specify rows for input parameter

**Syntax** `setRowSpan(input_param, [start_row end_row])`

**Description** `setRowSpan(input_param, [start_row end_row])` specifies the number of rows that the parameter occupies. Specify where you want an input parameter located in the layout grid when there are multiple input parameters.

|                        |                          |                                                                                                    |
|------------------------|--------------------------|----------------------------------------------------------------------------------------------------|
| <b>Input Arguments</b> | <code>input_param</code> | The input parameter object                                                                         |
|                        | <code>start_row</code>   | A positive integer representing the first row that the input parameter occupies in the layout grid |
|                        | <code>end_row</code>     | A positive integer representing the last row that the input parameter occupies in the layout grid  |

**Examples**

```
inputParam2 = ModelAdvisor.InputParameter;  
inputParam2.Name = 'Standard font size';  
inputParam2.Value='12';  
inputParam2.Type='String';  
inputParam2.Description='sample tooltip';  
inputParam2.setRowSpan([2 2]);  
inputParam2.setColSpan([1 1]);
```

# ModelAdvisor.FormatTemplate.setSubBar

---

**Purpose** Add line between subcheck results

**Syntax** `setSubBar(ft_obj, value)`

**Description** `setSubBar(ft_obj, value)` is an optional method that adds lines between results for subchecks. *ft\_obj* is a handle to a template object. *value* is a boolean value that specifies when the Model Advisor includes a line between subchecks in the check results. By default, the value is `true`, and the Model Advisor displays the bar. The Model Advisor does not display the bar when you set the value to `false`.

**Examples** Create a list object, `ft`, turn off the subbar:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
setSubBar(ft, false);
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”
- “Format Model Advisor Results”

# ModelAdvisor.FormatTemplate.setSubResultStatus

---

**Purpose** Add status to check or subcheck result

**Syntax** `setSubResultStatus(ft_obj, 'status')`

**Description** `setSubResultStatus(ft_obj, 'status')` is an optional method that displays the status in the result. Use this method to display the status of the check or subcheck in the result. *ft\_obj* is a handle to a template object. *status* is a string identifying the status of the check. Valid strings are:

Pass  
Warn  
Fail

**Examples** Create a list object, *ft*, and add a passing status:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
setSubResultStatus(ft, 'Pass');
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”
- “Format Model Advisor Results”

# ModelAdvisor.FormatTemplate.setSubResultStatusText

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Add text below status in result                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax</b>          | <code>setSubResultStatusText(<i>ft_obj</i>, <i>message</i>)</code>                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>     | <code>setSubResultStatusText(<i>ft_obj</i>, <i>message</i>)</code> is an optional method that displays text below the status in the result. Use this method to describe the status.                                                                                                                                                                                                                                                                |
| <b>Input Arguments</b> | <p><b>ft_obj</b><br/>A handle to a template object.</p> <p><b>message</b><br/>A string or a handle to a formatting object that the Model Advisor displays below the status in the report.</p> <p>Valid formatting objects are: <code>ModelAdvisor.Image</code>, <code>ModelAdvisor.LineBreak</code>, <code>ModelAdvisor.List</code>, <code>ModelAdvisor.Paragraph</code>, <code>ModelAdvisor.Table</code>, and <code>ModelAdvisor.Text</code>.</p> |
| <b>Examples</b>        | <p>Create a list object, <code>ft</code>, add a passing status and a description of why the check passed:</p> <pre>ft = ModelAdvisor.FormatTemplate('ListTemplate'); setSubResultStatus(ft, 'Pass'); setSubResultStatusText(ft, ['Constructs that are not supported when '...     'generating code were not found in the model or subsystem']);</pre>                                                                                              |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>How To</b>          | <ul style="list-style-type: none"><li>• “Model Advisor Customization”</li><li>• “Format Model Advisor Results”</li></ul>                                                                                                                                                                                                                                                                                                                           |

# ModelAdvisor.Text.setSubscript

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                         |                   |                                                           |                   |                                                                                                                                                                                                                          |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Specify subscripted text                                                                                                                                                                                                                                                                                                                                                                |                   |                                                           |                   |                                                                                                                                                                                                                          |
| <b>Syntax</b>          | <code>setSubscript(text, mode)</code>                                                                                                                                                                                                                                                                                                                                                   |                   |                                                           |                   |                                                                                                                                                                                                                          |
| <b>Description</b>     | <code>setSubscript(text, mode)</code> indicates whether to make text subscript.                                                                                                                                                                                                                                                                                                         |                   |                                                           |                   |                                                                                                                                                                                                                          |
| <b>Input Arguments</b> | <table><tr><td><code>text</code></td><td>Instantiation of the <code>ModelAdvisor.Text</code> class</td></tr><tr><td><code>mode</code></td><td>A Boolean value indicating subscripted formatting of text:<ul style="list-style-type: none"><li>• <code>true</code> — Make the text subscript.</li><li>• <code>false</code> — Do not make the text subscript.</li></ul></td></tr></table> | <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class | <code>mode</code> | A Boolean value indicating subscripted formatting of text: <ul style="list-style-type: none"><li>• <code>true</code> — Make the text subscript.</li><li>• <code>false</code> — Do not make the text subscript.</li></ul> |
| <code>text</code>      | Instantiation of the <code>ModelAdvisor.Text</code> class                                                                                                                                                                                                                                                                                                                               |                   |                                                           |                   |                                                                                                                                                                                                                          |
| <code>mode</code>      | A Boolean value indicating subscripted formatting of text: <ul style="list-style-type: none"><li>• <code>true</code> — Make the text subscript.</li><li>• <code>false</code> — Do not make the text subscript.</li></ul>                                                                                                                                                                |                   |                                                           |                   |                                                                                                                                                                                                                          |
| <b>Examples</b>        | <pre>t1 = ModelAdvisor.Text('This is some text'); setSubscript(t1, 'true');</pre>                                                                                                                                                                                                                                                                                                       |                   |                                                           |                   |                                                                                                                                                                                                                          |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                                                                                                                                                                                                           |                   |                                                           |                   |                                                                                                                                                                                                                          |
| <b>How To</b>          | • “Authoring Checks”                                                                                                                                                                                                                                                                                                                                                                    |                   |                                                           |                   |                                                                                                                                                                                                                          |

|                        |                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                           |                   |                                                                                                                                                                                                                                |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Specify superscripted text                                                                                                                                                                                                                                                                                                                                                                    |                   |                                                           |                   |                                                                                                                                                                                                                                |
| <b>Syntax</b>          | <code>setSuperscript(text, mode)</code>                                                                                                                                                                                                                                                                                                                                                       |                   |                                                           |                   |                                                                                                                                                                                                                                |
| <b>Description</b>     | <code>setSuperscript(text, mode)</code> indicates whether to make text superscript.                                                                                                                                                                                                                                                                                                           |                   |                                                           |                   |                                                                                                                                                                                                                                |
| <b>Input Arguments</b> | <table><tr><td><code>text</code></td><td>Instantiation of the <code>ModelAdvisor.Text</code> class</td></tr><tr><td><code>mode</code></td><td>A Boolean value indicating superscripted formatting of text:<ul style="list-style-type: none"><li>• <code>true</code> — Make the text superscript.</li><li>• <code>false</code> — Do not make the text superscript.</li></ul></td></tr></table> | <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class | <code>mode</code> | A Boolean value indicating superscripted formatting of text: <ul style="list-style-type: none"><li>• <code>true</code> — Make the text superscript.</li><li>• <code>false</code> — Do not make the text superscript.</li></ul> |
| <code>text</code>      | Instantiation of the <code>ModelAdvisor.Text</code> class                                                                                                                                                                                                                                                                                                                                     |                   |                                                           |                   |                                                                                                                                                                                                                                |
| <code>mode</code>      | A Boolean value indicating superscripted formatting of text: <ul style="list-style-type: none"><li>• <code>true</code> — Make the text superscript.</li><li>• <code>false</code> — Do not make the text superscript.</li></ul>                                                                                                                                                                |                   |                                                           |                   |                                                                                                                                                                                                                                |
| <b>Examples</b>        | <pre>t1 = ModelAdvisor.Text('This is some text'); setSuperscript(t1, 'true');</pre>                                                                                                                                                                                                                                                                                                           |                   |                                                           |                   |                                                                                                                                                                                                                                |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                                                                                                                                                                                                                 |                   |                                                           |                   |                                                                                                                                                                                                                                |
| <b>How To</b>          | • “Authoring Checks”                                                                                                                                                                                                                                                                                                                                                                          |                   |                                                           |                   |                                                                                                                                                                                                                                |

# ModelAdvisor.FormatTemplate.setSubTitle

---

**Purpose** Add title for subcheck in result

**Syntax** `setSubTitle(ft_obj, title)`

**Description** `setSubTitle(ft_obj, title)` is an optional method that adds a subcheck result title. Use this method when you create subchecks to distinguish between them in the result.

## Input Arguments

### **ft\_obj**

A handle to a template object.

### **title**

A string or a handle to a formatting object specifying the title of the subcheck.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

## Examples

Create a list object, `ft`, and add a subcheck title:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
setSubTitle(ft, ['Check for constructs in the model '...
    'that are not supported when generating code']);
```

## See Also

“Model Advisor Customization”

## How To

- “Authoring Checks”
- “Format Model Advisor Results”



# ModelAdvisor.FormatTemplate.setTableInfo

---

**Purpose** Add data to table

**Syntax** `setTableInfo(ft_obj, {data})`

**Description** `setTableInfo(ft_obj, {data})` is an optional method that creates a table. *ft\_obj* is a handle to a table template object. *data* is a cell array of strings or objects specifying the information in the body of the table. The Model Advisor creates hyperlinks to objects. If you do not add data to the table, the Model Advisor does not display the table in the result.

---

**Note** Before creating a table, you must specify column titles using the `setColTitle` method.

---

**Examples** Create a table object, `ft`, add column titles, and add data to the table:

```
ft = ModelAdvisor.FormatTemplate('TableTemplate');
setColTitle(ft, {'Index', 'Block Name'});
setTableInfo(ft, {'1', 'Gain'});
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”
- “Format Model Advisor Results”

# ModelAdvisor.FormatTemplate.setTableTitle

---

**Purpose** Add title to table

**Syntax** `setTableTitle(ft_obj, title)`

**Description** `setTableTitle(ft_obj, title)` is an optional method that adds a title to a table.

**Input Arguments**

**ft\_obj**

A handle to a template object.

**title**

A string or a handle to a formatting object specifying the title of the table.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

The title appears above the table. If you do not add data to the table, the Model Advisor does not display the table and title in the result.

**Examples**

Create a table object, `ft`, and add a table title:

```
ft = ModelAdvisor.FormatTemplate('TableTemplate');  
setTableTitle(ft, 'Table of fonts and styles used in model');
```

**See Also**

“Model Advisor Customization”

**How To**

- “Authoring Checks”
- “Format Model Advisor Results”

**Purpose** Specify list type

**Syntax** setType(list\_obj, listType)

**Description** setType(list\_obj, listType) specifies the type of list the ModelAdvisor.List constructor creates.

**Input Arguments**

|          |                                                                                                        |
|----------|--------------------------------------------------------------------------------------------------------|
| list_obj | Instantiation of the ModelAdvisor.List class                                                           |
| listType | Specifies the list type: <ul style="list-style-type: none"><li>• numbered</li><li>• bulleted</li></ul> |

**Examples**

```
subList = ModelAdvisor.List();
subList.setType('numbered')
subList.addItem(ModelAdvisor.Text('Sub entry 1', {'pass','bold'}));
subList.addItem(ModelAdvisor.Text('Sub entry 2', {'pass','bold'}));
```

**See Also** “Model Advisor Customization”

**How To**

- “Authoring Checks”

# ModelAdvisor.Text.setUnderlined

---

|                        |                                                                                                                                                                                                                                                                                                                                                                              |                   |                                                           |                   |                                                                                                                                                                                                               |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Underline text                                                                                                                                                                                                                                                                                                                                                               |                   |                                                           |                   |                                                                                                                                                                                                               |
| <b>Syntax</b>          | <code>setUnderlined(text, mode)</code>                                                                                                                                                                                                                                                                                                                                       |                   |                                                           |                   |                                                                                                                                                                                                               |
| <b>Description</b>     | <code>setUnderlined(text, mode)</code> indicates whether to underline text.                                                                                                                                                                                                                                                                                                  |                   |                                                           |                   |                                                                                                                                                                                                               |
| <b>Input Arguments</b> | <table><tr><td><code>text</code></td><td>Instantiation of the <code>ModelAdvisor.Text</code> class</td></tr><tr><td><code>mode</code></td><td>A Boolean value indicating underlined formatting of text:<ul style="list-style-type: none"><li>• <code>true</code> — Underline the text.</li><li>• <code>false</code> — Do not underline the text.</li></ul></td></tr></table> | <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class | <code>mode</code> | A Boolean value indicating underlined formatting of text: <ul style="list-style-type: none"><li>• <code>true</code> — Underline the text.</li><li>• <code>false</code> — Do not underline the text.</li></ul> |
| <code>text</code>      | Instantiation of the <code>ModelAdvisor.Text</code> class                                                                                                                                                                                                                                                                                                                    |                   |                                                           |                   |                                                                                                                                                                                                               |
| <code>mode</code>      | A Boolean value indicating underlined formatting of text: <ul style="list-style-type: none"><li>• <code>true</code> — Underline the text.</li><li>• <code>false</code> — Do not underline the text.</li></ul>                                                                                                                                                                |                   |                                                           |                   |                                                                                                                                                                                                               |
| <b>Examples</b>        | <pre>t1 = ModelAdvisor.Text('This is some text'); setUnderlined(t1, 'true');</pre>                                                                                                                                                                                                                                                                                           |                   |                                                           |                   |                                                                                                                                                                                                               |
| <b>See Also</b>        | “Model Advisor Customization”                                                                                                                                                                                                                                                                                                                                                |                   |                                                           |                   |                                                                                                                                                                                                               |
| <b>How To</b>          | • “Authoring Checks”                                                                                                                                                                                                                                                                                                                                                         |                   |                                                           |                   |                                                                                                                                                                                                               |

**Purpose** Retrieve signal range coverage information from cvdata object

**Syntax** `[min, max] = sigrangeinfo(cvdo, object)`  
`[min, max] = sigrangeinfo(cvdo, object, portID)`

**Description** `[min, max] = sigrangeinfo(cvdo, object)` returns the minimum and maximum signal values output by the model component `object` within the `cvdata` object `cvdo`.

`[min, max] = sigrangeinfo(cvdo, object, portID)` returns the minimum and maximum signal values associated with the output port `portID` of the Simulink block `object`.

**Input Arguments** **cvdo**  
`cvdata` object

**object**  
 An object in the model or Stateflow chart that receives signal range coverage. Valid values for `object` include the following:

| Object Specification           | Description                                                                                                                  |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <code>BlockPath</code>         | Full path to a model or block                                                                                                |
| <code>BlockHandle</code>       | Handle to a model or block                                                                                                   |
| <code>s1obj</code>             | Handle to a Simulink API object                                                                                              |
| <code>sfID</code>              | Stateflow ID                                                                                                                 |
| <code>sfObj</code>             | Handle to a Stateflow API object                                                                                             |
| <code>{BlockPath, sfID}</code> | Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |

## Object Specification

{BlockPath, sfObj}

[BlockHandle, sfID]

## Description

Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart

Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

## portID

Output port of the block object

## Output Arguments

### max

Maximum signal value output by the model component object within the cvdata object, cvdo. If object outputs a vector, min and max are also vectors.

### min

Minimum signal value output by the model component object within the cvdata object, cvdo. If object outputs a vector, min and max are also vectors.

## Alternatives

Use the Coverage Settings dialog box to collect signal range coverage for a model:

- 1 Open the model for which you want to collect signal range coverage.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** tab, select **Coverage for this model**.
- 4 Under **Coverage metrics**, select **Signal Range**.

- 5 On the **Results** and **Reporting** tabs, specify the output you need.
- 6 Click **OK** to close the Coverage Settings dialog box and save your changes.
- 7 Simulate the model and review the results.

## Examples

Collect signal range data for the Product block in the slvndemo\_cv\_small\_controller model:

```
mdl = 'slvndemo_cv_small_controller';
open_system(mdl)
%Create test spec object
testObj = cvtest(mdl)
%Enable signal range coverage
testObj.settings.sigrange = 1;
%Simulate the model
data = cvsim(testObj)
blk_handle = get_param([mdl, '/Product'], 'Handle');
%Get signal range data
[minVal, maxVal] = sigrangeinfo(data, blk_handle)
```

## See Also

complexityinfo | conditioninfo | cvsim | decisioninfo |  
getCoverageInfo | mcdcinfo | overflowsaturationinfo |  
sigsizeinfo | tableinfo

# sigsizeinfo

---

**Purpose** Retrieve signal size coverage information from cvdata object

**Syntax** [min, max, allocated] = sigsizeinfo(data, object)  
[min, max, allocated] = sigsizeinfo(data, object, portID)

**Description** [min, max, allocated] = sigsizeinfo(data, object) returns the minimum, maximum, and allocated signal sizes for the outputs of model component `object` within the coverage data object `data`, if `object` supports variable size signals.

[min, max, allocated] = sigsizeinfo(data, object, portID) returns the minimum and maximum signal sizes associated with the output port `portID` of the model component `object`.

## Input Arguments

**data**  
cvdata object

**object**  
An object in the model or Stateflow chart that receives signal size coverage. Valid values for `object` include the following:

| Object Specification | Description                                                                                                                  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------|
| BlockPath            | Full path to a Simulink model or block                                                                                       |
| BlockHandle          | Handle to a Simulink model or block                                                                                          |
| s1obj                | Handle to a Simulink API object                                                                                              |
| sfID                 | Stateflow ID                                                                                                                 |
| sfObj                | Handle to a Stateflow API object                                                                                             |
| {BlockPath, sfID}    | Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |



**Object Specification**`{BlockPath, sfObj}`**Description**

Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart

`[BlockHandle, sfID]`

Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

**Output Arguments****portID**

Output port number of the model component `object`

**max**

Maximum signal size output by the model component `object` within the `cvdata` object `data`. If `object` has multiple outputs, `max` is a vector.

**min**

Minimum signal size output by the model component `object` within the `cvdata` object `data`. If `object` has multiple outputs, `min` is a vector.

**allocated**

Allocated signal size output by the model component `object` within the `cvdata` object `data`. If `object` has multiple outputs, `allocated` is a vector.

**Examples**

Collect signal size coverage data for the Switch block in the `sldemo_varsize_basic` model:

```
mdl = 'sldemo_varsize_basic';
open_system(mdl);
%Create test spec object
testObj = cvtest(mdl);
```

# sigsizeinfo

---

```
%Enable signal size coverage
testObj.settings.sigsize=1;
%Simulate the model
data = cvsim(testObj);
%Set the block handle
blk_handle = get_param([mdl, '/Switch'], 'Handle');
%Get signal size data
[minVal, maxVal, allocVal] = sigsizeinfo(data, blk_handle);
```

## Alternatives

Use the Coverage Settings dialog box to collect signal size coverage for a model:

- 1** Open the model for which you want to collect signal size coverage.
- 2** In the Simulink Editor, select **Analysis > Coverage > Settings**.
- 3** On the **Coverage** tab, select **Coverage for this model**.
- 4** Under **Coverage metrics**, select **Signal Size**.
- 5** On the **Results** and **Reporting** tabs, specify the output you need.
- 6** Click **OK** to close the Coverage Settings dialog box and save your changes.
- 7** Simulate the model and review the results.

## See Also

[complexityinfo](#) | [conditioninfo](#) | [cvsim](#) | [decisioninfo](#) | [mddcinfo](#)  
| [sigrangeinfo](#) | [tableinfo](#)

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Extract subsystem or subchart contents into new model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>          | <pre>newModel = slvnvextract(subsystem) newModel = slvnvextract(subchart) newModel = slvnvextract(subsystem, showModel) newModel = slvnvextract(subchart, showModel)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>     | <p><code>newModel = slvnvextract(subsystem)</code> extracts the contents of the Atomic Subsystem block <code>subsystem</code> and creates a new model. <code>slvnvextract</code> returns the name of the new model in <code>newModel</code>. <code>slvnvextract</code> uses the subsystem name for the model name, appending a numeral to the model name if that model name already exists.</p> <p><code>newModel = slvnvextract(subchart)</code> extracts the contents of the atomic subchart <code>subchart</code> and creates a new model. <code>subchart</code> should specify the full path of the atomic subchart. <code>slvnvextract</code> uses the subchart name for the model name, appending a numeral to the model name if that model name already exists.</p> <hr/> <p><b>Note</b> If the atomic subchart calls an exported graphical function that is outside the subchart, <code>slvnvextract</code> creates the model, but the new model will not compile.</p> <hr/> <p><code>newModel = slvnvextract(subsystem, showModel)</code> and <code>newModel = slvnvextract(subchart, showModel)</code> open the extracted model if you set <code>showModel</code> to <code>true</code>. The extracted model is only loaded if <code>showModel</code> is set to <code>false</code>.</p> |
| <b>Input Arguments</b> | <p><b>subsystem</b><br/>Full path to the atomic subsystem</p> <p><b>subchart</b><br/>Full path to the atomic subchart</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## **showModel**

Boolean indicating whether to display the extracted model

**Default:** True

## **Output Arguments**

### **newModel**

Name of the new model

## **Examples**

Extract the Atomic Subsystem block, Bus Counter, from the `sldemo_md1ref_conversion` model and copy it into a new model:

```
open_system('sldemo_md1ref_conversion');
newmodel = slvnvextract('sldemo_md1ref_conversion/Bus Counter', true);
```

---

Extract the Atomic Subchart block, Sensor1, from the `sf_atomic_sensor_pair` model and copy it into a new model:

```
open_system('sf_atomic_sensor_pair');
newmodel = ...
    slvnvextract('sf_atomic_sensor_pair/RedundantSensors/Sensor1', true);
```

**Purpose** Generate default options for `slvnvmakeharness`

**Syntax** `harnessopts = slvnharnessopts`

**Description** `harnessopts = slvnharnessopts` generates the default configuration for running `slvnvmakeharness`.

**Output Arguments** **harnessopts**

A structure whose fields specify the default configuration for `slvnvmakeharness`. The `harnessopts` structure can have the following fields. Default values are used if not specified.

| Field                        | Description                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>harnessFilePath</code> | Specifies the file path for creating the harness model. If an invalid path is specified, <code>slvnvmakeharness</code> does not save the harness model, but it creates and opens the harness model. If this option is not specified, <code>slvnvmakeharness</code> generates a new harness model and saves it in the MATLAB current folder.<br><br>Default: '' |
| <code>modelRefHarness</code> | Generates the test harness model that includes <code>model</code> in a Model block. When <code>false</code> , the test harness model includes a copy of <code>model</code> .<br><br>Default: <code>true</code>                                                                                                                                                 |

# slvnharnessopts

---

| Field             | Description                                                                                                                                                                                                                                                                                                                   |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| usedSignalsOnly   | When true, the Signal Builder block in the harness model has signals only for input signals used in the model. The Simulink Design Verifier software must be available, and <code>model</code> must be compatible with the Simulink Design Verifier software to detect the used input signals.<br>Default: <code>false</code> |
| systemTestHarness | When true, generates a SystemTest™ harness. This option requires <code>dataFile</code> path in addition to <code>model</code> .<br>Default: <code>false</code>                                                                                                                                                                |

## Examples

Create a test harness for the `sldemo_md1ref_house` model using the default options:

```
open_system('sldemo_md1ref_house');  
harnessOpts = slvnharnessopts;  
[harnessfile] = slvnmakeharness('sldemo_md1ref_house',...  
    '', harnessOpts);
```

## See Also

`slvnmakeharness`

## Purpose

Log test data for component or model during simulation

## Syntax

```
data = slvnlvlogsignals(model_block)
data = slvnlvlogsignals(harness_model)
data = slvnlvlogsignals(harness_model, test_case_index)
```

## Description

`data = slvnlvlogsignals(model_block)` simulates the model that contains `model_block` and logs the input signals to the `model_block` block. `model_block` must be a Simulink Model block. `slvnlvlogsignals` records the logged data in the structure `data`.

`data = slvnlvlogsignals(harness_model)` simulates every test case in `harness_model` and logs the input signals to the Test Unit block in the harness model. You must generate `harness_model` using the Simulink Design Verifier analysis, `sldvmakeharness`, or `slvnlvmakeharness`.

`data = slvnlvlogsignals(harness_model, test_case_index)` simulates every test case in the Signal Builder block of the `harness_model` specified by `test_case_index`. `slvnlvlogsignals` logs the input signals to the Test Unit block in the harness model. If you omit `test_case_index`, `slvnlvlogsignals` simulates every test case in the Signal Builder.

## Input Arguments

### **model\_block**

Full block path name or handle to a Simulink Model block

### **harness\_model**

Name or handle to a harness model that the Simulink Design Verifier software, `sldvmakeharness`, or `slvnlvmakeharness` creates

### **test\_case\_index**

Array of integers that specifies which test cases in the Signal Builder block of the harness model to simulate

# slvnlvsignals

---

## Output Arguments

### **data**

Structure that contains the logged data

## Examples

Log simulation data for a Model block. Use the logged data to create a harness model and visualize the data in the referenced model.

- 1 Simulate the CounterB Model block, which references the `sldemo_mdhref_counter` model, in the context of the `sldemo_mdhref_basic` model and log the data:

```
open_system('sldemo_mdhref_basic');  
data = slvnlvsignals('sldemo_mdhref_basic/CounterB');
```

- 2 Create a harness model for `sldemo_mdhref_counter` using the logged data and the default harness options:

```
load_system('sldemo_mdhref_counter');  
harnessOpts = slvnlvharnessopts  
[harnessFilePath] = ...  
    slvnlvmakeharness('sldemo_mdhref_counter', data, ...  
    harnessOpts);
```

## See Also

`sldvmakeharness` | `slvnlvruncgvttest` | `slvnlvrunttest` | `slvnlvmakeharness`



## Purpose

Generate Simulink Verification and Validation harness model

## Syntax

```
[harnessFilePath] = slvnvmakeharness(model)
[harnessFilePath] = slvnvmakeharness(model, dataFile)
[harnessFilePath] = slvnvmakeharness(model,
dataFile, harnessOpts)
```

## Description

[harnessFilePath] = slvnvmakeharness(model) generates a test harness from model, which is a handle to a Simulink model or a string with the model name. slvnvmakeharness returns the path and file name of the generated harness model in harnessFilePath. slvnvmakeharness creates an empty harness model; the test harness includes one default test case that specifies the default values for all input signals.

[harnessFilePath] = slvnvmakeharness(model, dataFile) generates a test harness from the data file dataFile.

[harnessFilePath] = slvnvmakeharness(model, dataFile, harnessOpts) generates a test harness from model using the dataFile and harnessOpts, which specifies the harness creation options. Requires '' for dataFile if dataFile is not available.

## Input Arguments

### model

Handle to a Simulink model or a string with the model name

### dataFile

Name of the file containing the data.

**Default:** ''

### harnessOpts

A structure whose fields specify the configuration for slvnvmakeharness:

# slvnvmakeharness

| Field           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| harnessFilePath | <p>Specifies the file path for creating the harness model. If an invalid path is specified, <code>slvnvmakeharness</code> does not save the harness model, but it creates and opens the harness model. If this option is not specified, the <code>slvnvoptions</code> object is used. If this option is not specified, <code>slvnvmakeharness</code> generates a new harness model and saves it in the MATLAB current folder.</p> <p>Default: ''</p>                                                                                                                             |
| modelRefHarness | <p>Generates the test harness model that includes <code>model</code> in a Model block. When <code>false</code>, the test harness model includes a copy of <code>model</code>.</p> <p>Default: true</p> <hr/> <p><b>Note</b> If your model contains bus objects and you set <code>modelRefHarness</code> to <code>true</code>, in the <b>Configuration Parameters &gt; Diagnostics &gt; Connectivity</b> pane, you must set the <b>Mux blocks used to create bus signals</b> parameter to <code>error</code>. For more information, see “Prevent Bus and Mux Mixtures”.</p> <hr/> |

| Field             | Description                                                                                                                                                                                                                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| usedSignalsOnly   | When true, the Signal Builder block in the harness model has signals only for input signals used in the model. The Simulink Design Verifier software must be available, and <code>model</code> must be compatible with the Simulink Design Verifier software to detect the used input signals.<br><br>Default: false |
| systemTestHarness | When true, generates a SystemTest harness. This option requires <code>dataFile</code> path in addition to <code>model</code> .<br><br>Default: false                                                                                                                                                                 |

**Note** To create a default `harnessOpts` object, at the MATLAB command prompt, type:

```
slvnvharnessopts
```

## Output Arguments

### **harnessFilePath**

String containing the path and file name of the generated harness model

## Examples

Create a test harness for the `sldemo_md1ref_house` model using the default options:

```
open_system('sldemo_md1ref_house');
[harnessfile] = slvnvmakeharness('sldemo_md1ref_house', '', harnessOpts);
```

## See Also

[slvnvharnessopts](#) | [slvnvmergeharness](#)

# slvnvmergedata

---

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>          | Combine test data from data files                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax</b>           | <code>merged_data = slvnvmergedata(data1,data2,...)</code>                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>      | <code>merged_data = slvnvmergedata(data1,data2,...)</code> combines two or more test cases and counterexamples <code>data</code> into a single test case data structure <code>merged_data</code> .                                                                                                                                                                                                                     |
| <b>Input Arguments</b>  | <b>data</b><br>Structure that contains test case or counterexample data. Generate this structure by running <code>slvnvlogsignals</code> , or by running a Simulink Design Verifier analysis.                                                                                                                                                                                                                          |
| <b>Output Arguments</b> | <b>merged_data</b><br>Structure that contains the merged test cases or counterexamples                                                                                                                                                                                                                                                                                                                                 |
| <b>Examples</b>         | Open the <code>sldemo_md1ref_basic</code> model, which contains three Model blocks that reference the model <code>sldemo_md1ref_counter</code> . Log the input signals to the three Model blocks and merge the logged data using <code>slvnvmergedata</code> . Simulate the referenced model, <code>sldemo_md1ref_counter</code> , for coverage with the merged data and display the coverage results in an HTML file. |

```
sldemo_md1ref_basic;
data1 = slvnvlogsignals('sldemo_md1ref_basic/CounterA');
data2 = slvnvlogsignals('sldemo_md1ref_basic/CounterB');
data3 = slvnvlogsignals('sldemo_md1ref_basic/CounterC');
merged_data = slvnvmergedata(data1, data2, data3);
open_system('sldemo_md1ref_counter');
runOpts = slvnvruntestopts;
runOpts.coverageEnabled = true;
[ outData, initialCov ] = slvnvruntest('sldemo_md1ref_counter', ...
    merged_data, runOpts);
cvhtml('Initial coverage', initialCov);
```

**See Also**

slvrun | slvnvlogsignals | slvnvmakeharness | slvnvruncgvttest  
| slvnvrunttest

# slvnvmergeharness

---

## **Purpose**

Combine test data from harness models

## **Syntax**

```
status = slvnvmergeharness(name, models,  
initialization_commands)
```

## **Description**

`status = slvnvmergeharness(name, models, initialization_commands)` collects the test data and initialization commands from each test harness model in `models`. `slvnvmergeharness` saves the data and initialization commands in `name`, which is a handle to the new model.

`initialization_commands` is a cell array of strings the same length as `models`. It defines parameter settings for the test cases of each test harness model.

If `name` does not exist, `slvnvmergeharness` creates it as a copy of the first model in `models`. `slvnvmergeharness` then merges data from other models listed in `models` into this model. If you create `name` from a previous `slvnvmergeharness` run, subsequent runs of `slvnvmergeharness` for `name` maintain the structure and initialization from the earlier run. If `name` matches an existing Simulink model, `slvnvmergeharness` merges the test data from `models` into `name`.

`slvnvmergeharness` assumes that `name` and the rest of the models in `models` have only one Signal Builder block on the top level. If a model in `models` does not meet this restriction or its top-level Signal Builder block does not have the same number of signals as the top-level Signal Builder block in `name`, `slvnvmergeharness` does not merge that model's test data into `name`.

## **Input Arguments**

### **name**

Name of the new harness model, to be stored in the default MATLAB folder

### **models**

A cell array of strings that represent harness model names

## initialization\_commands

A cell array of strings the same length as `models`. `initialization_commands` defines parameter settings for the test cases of each test harness model.

## Output Arguments

### status

If the function saves the data and initialization commands in `name`, `slvnvmergeharness` returns a `status` of 1. Otherwise, it returns 0.

## Examples

Log the input signals to the three Model blocks in the `sldemo_md1ref_basic` example model that each reference the same model. Make three test harnesses using the logged signals and merge the three test harnesses:

```
open_system('sldemo_md1ref_basic');
data1 = slvnvlogsignals('sldemo_md1ref_basic/CounterA');
data2 = slvnvlogsignals('sldemo_md1ref_basic/CounterB');
data3 = slvnvlogsignals('sldemo_md1ref_basic/CounterC');
open_system('sldemo_md1ref_counter');
harness1FilePath = slvnvmakeharness('sldemo_md1ref_counter', data1);
harness2FilePath = slvnvmakeharness('sldemo_md1ref_counter', data2);
harness3FilePath = slvnvmakeharness('sldemo_md1ref_counter', data3)
[~, harness1] = fileparts(harness1FilePath);
[~, harness2] = fileparts(harness2FilePath);
[~, harness3] = fileparts(harness3FilePath);
slvnvmergeharness('new_harness_model',{harness1, harness2, harness3});
```

## See Also

`slvnvlogsignals` | `slvnvmakeharness`

# slvnvruncgvtest

---

**Purpose** Invoke Code Generation Verification (CGV) API and execute model

**Syntax**

```
cgvObject = slvnvruncgvtest(model, dataFile)
cgvObject = slvnvruncgvtest(model, dataFile, runOpts)
```

**Description** `cgvObject = slvnvruncgvtest(model, dataFile)` invokes the Code Generation Verification (CGV) API methods and executes the `model` using all test cases in `dataFile`. `cgvObject` is a `cgv.CGV` object that `slvnvruncgvtest` creates during the execution of the `model`. `slvnvruncgvtest` sets the execution mode for `cgvObject` to 'sim' by default.

`cgvObject = slvnvruncgvtest(model, dataFile, runOpts)` invokes CGV API methods and executes the `model` using test cases in `dataFile`. `runOpts` defines the options for executing the test cases. The settings in `runOpts` determine the configuration of `cgvObject`.

**Tips** To run `slvnvruncgvtest`, you must have a Embedded Coder® license.

If your model has parameters that are not configured for executing test cases with the CGV API, `slvnvruncgvtest` reports warnings about the invalid parameters. If you see these warnings, do one of the following:

- Modify the invalid parameters and rerun `slvnvruncgvtest`.
- Set `allowCopyModel` in `runOpts` to be `true` and rerun `slvnvruncgvtest`. `slvnvruncgvtest` makes a copy of your model configured for executing test cases, and invokes the CGV API.

**Input Arguments**

**model**  
Name of the Simulink model to execute

**dataFile**  
Name of the data file or a structure that contains the input data. Data can be generated either by:

- Analyzing the model using the Simulink Design Verifier software.



- Using the `slvnvlogssignals` function.

## runOpts

A structure whose fields specify the configuration of `slvnvruncgvttest`.

| Field Name                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>testIdx</code>        | <p>Test case index array to simulate from <code>dataFile</code>.</p> <p>If <code>testIdx = []</code> (the default), <code>slvnvruncgvttest</code> simulates all test cases.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <code>allowCopyModel</code> | <p>Specifies to create and configure the model if you have not configured it for executing test cases with the CGV API.</p> <p>If <code>true</code> and you have not configured your <code>model</code> to execute test cases with the CGV API, <code>slvnvruncgvttest</code> copies the model, fixes the configuration, and executes the test cases on the copied model.</p> <p>If <code>false</code> (the default), an error occurs if the tests cannot execute with the CGV API.</p> <hr/> <p><b>Note</b> If you have not configured the top-level model or any referenced models to execute test cases, <code>slvnvruncgvttest</code> does not copy the model, even if <code>allowCopyModel</code> is <code>true</code>. An error occurs.</p> <hr/> |

# slvnvruncgvtest

---

| Field Name  | Description                                                                                                                                                                           |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cgvCompType | Defines the software-in-the-loop (SIL) or processor-in-the-loop (PIL) approach for CGV: <ul style="list-style-type: none"><li>• 'topmodel' (default)</li><li>• 'modelblock'</li></ul> |
| cgvConn     | Specifies mode of execution for CGV: <ul style="list-style-type: none"><li>• 'sim' (default)</li><li>• 'sil'</li><li>• 'pil'</li></ul>                                                |

---

**Note** runOpts = slvnvruntestopts('cgv') returns a runOpts structure with the default values for each field.

---

## Output Arguments

### cgvObject

cgv.CGV object that slvnvruncgvtest creates during the execution of model.

slvnvruncgvtest saves the following data for each test case executed in an array of Simulink.SimulationOutput objects inside cgvObject.

| Field                | Description     |
|----------------------|-----------------|
| tout_slvnvruncgvtest | Simulation time |
| xout_slvnvruncgvtest | State data      |

| Field                   | Description                                                                                                                                                               |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| yout_slvnvruncgvttest   | Output signal data                                                                                                                                                        |
| logout_slvnvruncgvttest | Signal logging data for: <ul style="list-style-type: none"> <li>• Signals connected to outputs</li> <li>• Signals that are configured for logging on the model</li> </ul> |

## Examples

Open the `sldemo_md1ref_basic` example model and log the input signals to the CounterA Model block.

```
open_system('sldemo_md1ref_basic');
load_system('sldemo_md1ref_counter');
loggedData = slvnvlogssignals('sldemo_md1ref_basic/CounterA');
```

Create the default configuration object for `slvnvruncgvttest`, and allow the model to be configured to execute test cases with the CGV API.

```
runOpts = slvnvruntestopts('cgv');
runOpts.allowCopyModel = true;
```

Using the logged signals, execute `slvnvruncgvttest`—first in simulation mode, and then in Software-in-the-Loop (SIL) mode—to invoke the CGV API and execute the specified test cases on the generated code for the model.

```
cgvObjectSim = slvnvruncgvttest('sldemo_md1ref_counter', loggedData, runOpts);
runOpts.cgvConn = 'sil';
cgvObjectSil = slvnvruncgvttest('sldemo_md1ref_counter', loggedData, runOpts);
```

Use the CGV API to compare the results of the first test case.

```
simout = cgvObjectSim.getOutputData(1);
silout = cgvObjectSil.getOutputData(1);
[matchNames, ~, mismatchNames, ~ ] = cgv.CGV.compare(simout, silout);
```

# slvnvruncgvtest

---

```
fprintf('\nTest Case: %d Signals match, %d Signals mismatch', ...  
        length(matchNames), length(mismatchNames));
```

## **See Also**

[cgv.CGV](#) | [slvnvlogsignals](#) | [slvnvruntest](#) | [slvnvruntestopts](#)

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Simulate model using input data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>          | <pre>outData = slvnvrntest(model, dataFile) outData = slvnvrntest(model, dataFile, runOpts) [outData, covData] = slvnvrntest(model, dataFile, runOpts)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>     | <p><code>outData = slvnvrntest(model, dataFile)</code> simulates <code>model</code> using all the test cases in <code>dataFile</code>. <code>outData</code> is an array of <code>Simulink.SimulationOutput</code> objects. Each array element contains the simulation output data of the corresponding test case.</p> <p><code>outData = slvnvrntest(model, dataFile, runOpts)</code> simulates <code>model</code> using all the test cases in <code>dataFile</code>. <code>runOpts</code> defines the options for simulating the test cases.</p> <p><code>[outData, covData] = slvnvrntest(model, dataFile, runOpts)</code> simulates <code>model</code> using the test cases in <code>dataFile</code>. When the <code>runOpts</code> field <code>coverageEnabled</code> is true, the Simulink Verification and Validation™ software collects model coverage information during the simulation. <code>slvnvrntest</code> returns the coverage data in the <code>cvdata</code> object <code>covData</code>.</p> |
| <b>Tips</b>            | <p>The <code>dataFile</code> that you create with a Simulink Design Verifier analysis or by running <code>slvnvlogsignals</code> contains time values and data values. When you simulate a model using these test cases, you might see missing coverage. This issue occurs when the time values in the <code>dataFile</code> are not aligned with the current simulation time step due to numeric calculation differences. You see this issue more frequently with multirate models—models that have multiple sample times.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Input Arguments</b> | <p><b>model</b><br/>Name or handle of the Simulink model to simulate</p> <p><b>dataFile</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

# slvnvrntest

Name of the data file or structure that contains the input data. You can generate `dataFile` using the Simulink Design Verifier software, or by running the `slvnvlogssignals` function.

## runOpts

A structure whose fields specify the configuration of `slvnvrntest`.

| Field                                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>testIdx</code>                 | Test case index array to simulate from <code>dataFile</code> . If <code>testIdx</code> is [], <code>slvnvrntest</code> simulates all test cases.<br><br><b>Default:</b> []                                                                                                                                                                                                                                                                                                                                                        |
| <code>signalLoggingSaveFormat</code> | Specifies signal logging data format for: <ul style="list-style-type: none"><li>• Signals connected to the outputs of the model</li><li>• Intermediate signals that are already configured for logging</li></ul> Valid values are: <ul style="list-style-type: none"><li>• 'Dataset' (default) — <code>slvnvrntest</code> stores the data in <code>Simulink.SimulationData.Dataset</code> objects.</li><li>• 'ModelDataLogs' — <code>slvnvrntest</code> stores the data in <code>Simulink.ModelDataLogs</code> objects.</li></ul> |

| Field           | Description                                                                                                                                       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| coverageEnabled | If true, specifies that the Simulink Verification and Validation software collect model coverage data during simulation.<br><b>Default:</b> false |
| coverageSetting | cvtest object for collecting model coverage. If [], slvnvrntest uses the existing coverage settings for model.<br><b>Default:</b> []              |

## Output Arguments

### outData

An array of Simulink.SimulationOutput objects that simulating the test cases generates. Each Simulink.SimulationOutput object has the following fields.

| Field Name         | Description                                                                                                                                                                |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| tout_slvnvrntest   | Simulation time                                                                                                                                                            |
| xout_slvnvrntest   | State data                                                                                                                                                                 |
| yout_slvnvrntest   | Output signal data                                                                                                                                                         |
| logout_slvnvrntest | Signal logging data for: <ul style="list-style-type: none"> <li>• Signals connected to outports</li> <li>• Signals that are configured for logging on the model</li> </ul> |

### covData

cvdata object that contains the model coverage data collected during simulation.

## Examples

Analyze the `sldemo_md1ref_basic` model and log the input signals to the CounterA Model block:

```
open_system('sldemo_md1ref_basic');  
loggedData = slvnvlogssignals('sldemo_md1ref_basic/CounterA');
```

Using the logged signals, simulate the model referenced in the Counter block (`sldemo_md1ref_counter`):

```
runOpts = slvnvrntestopts;  
runOpts.coverageEnabled = true;  
open_system('sldemo_md1ref_counter');  
[ outData ] = slvnvrntest('sldemo_md1ref_counter',...  
    loggedData, runOpts);
```

Examine the output data from the first test case using the Simulation Data Inspector:

```
Simulink.sdi.createRun('Test Case 1 Output', 'namevalue',...  
    {'output'}, {outData(1).find('logouts_slvnvrntest')});  
Simulink.sdi.view;
```

## See Also

`cvsim` | `cvtest` | `sim` | `slvnvrntestopts`



## Purpose

Generate simulation or execution options for `slvnvruntest` or `slvnvruncgvtest`

## Syntax

```
runOpts = slvnvruntestopts
runOpts = slvnvruntestopts('cgv')
```

## Description

`runOpts = slvnvruntestopts` generates a `runOpts` structure for `slvnvruntest`.

`runOpts = slvnvruntestopts('cgv')` generates a `runOpts` structure for `slvnvruncgvtest`.

## Output Arguments

### runOpts

A structure whose fields specify the configuration of `slvnvruntest` or `slvnvruncgvtest`. `runOpts` can have the following fields. If you do not specify a field, `slvnvruncgvtest` or `slvnvruntest` uses the default value.

| Field Name                                            | Description                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>testIdx</code>                                  | <p>Test case index array to simulate or execute from data file.</p> <p>If <code>testIdx = []</code>, all test cases are simulated or executed.</p> <p><b>Default:</b> <code>[]</code></p>                                                                                                                                                              |
| <code>SignalLogging</code><br><code>SaveFormat</code> | <p>Available only for <code>slvnvruntest</code>.</p> <p>Specifies format for signal logging data for signals connected to the outputs of the model and for intermediate signals configured for logging.</p> <ul style="list-style-type: none"> <li>'Dataset' — Data will be stored in <code>Simulink.SimulationData.Dataset</code> objects.</li> </ul> |

# slvnvruntestopts

---

| Field Name      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | <ul style="list-style-type: none"><li>'ModelDataLogs' — Data will be stored in Simulink.ModelDataLogs objects.</li></ul> <p><b>Default:</b> 'Dataset'</p>                                                                                                                                                                                                                                                                                  |
| coverageEnabled | Available only for slvnvruntest.<br>If true, slvnvruntest collects model coverage data during simulation.<br><b>Default:</b> false                                                                                                                                                                                                                                                                                                         |
| coverageSetting | Available only for slvnvruntest.<br>cvtest object to use for collecting model coverage.<br>If coverageSetting is [], slvnvruntest uses the coverage settings for the model specified in the call to slvnvruntest.<br><b>Default:</b> []                                                                                                                                                                                                    |
| allowCopyModel  | Available only for slvnvruncgvttest.<br>Specifies to create and configure the model if you have not configured it to execute test cases with the CGV API.<br>If true and you have not configured the model to execute test cases with the CGV API, slvnvruncgvttest copies the model, fixes the configuration, and executes the test cases on the copied model.<br>If false, an error occurs if the tests cannot execute with the CGV API. |

| Field Name               | Description                                                                                                                                                                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          | <p><b>Note</b> If you have not configured the top-level model or any referenced models to execute test cases, <code>slvnvruncgvtest</code> does not copy the model, even if <code>allowCopyModel</code> is true. An error occurs.</p> <p><b>Default:</b> false</p>              |
| <code>cgvCompType</code> | <p>Available only for <code>slvnvruncgvtest</code>.</p> <p>Defines the software-in-the-loop (SIL) or processor-in-the-loop (PIL) approach for CGV:</p> <ul style="list-style-type: none"> <li>• 'topmodel'</li> <li>• 'modelblock'</li> </ul> <p><b>Default:</b> 'topmodel'</p> |
| <code>cgvConn</code>     | <p>Available only for <code>slvnvruncgvtest</code>.</p> <p>Specifies mode of execution for CGV:</p> <ul style="list-style-type: none"> <li>• 'sim'</li> <li>• 'sil'</li> <li>• 'pil'</li> </ul> <p><b>Default:</b> 'sim'</p>                                                    |

## Examples

Create `runOpts` objects for `slvnvruntest` and `slvnvruncgvtest`:

```
%Create options for slvnvruntest
runtest_opts = slvnvruntestopts;
```

# slvnvruntestopts

---

```
%Create options for slvnvruncgvtest  
runcgvtest_opts = slvnvruntestopts('cgv')
```

**Alternatives** Create a runOpts object at the MATLAB command line.

**See Also** [slvnvruncgvtest](#) | [slvnvruntest](#)

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | Retrieve lookup table coverage information from cvdata object                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax</b>          | <pre>coverage = tableinfo(cvdo, object) coverage = tableinfo(cvdo, object, ignore_descendants) [coverage, exeCounts] = tableinfo(cvdo, object) [coverage, exeCounts, brkEquality] = tableinfo(cvdo, object)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>     | <p><code>coverage = tableinfo(cvdo, object)</code> returns lookup table coverage results from the cvdata object <code>cvdo</code> for the model component <code>object</code>.</p> <p><code>coverage = tableinfo(cvdo, object, ignore_descendants)</code> returns lookup table coverage results for <code>object</code>, depending on the value of <code>ignore_descendants</code>.</p> <p><code>[coverage, exeCounts] = tableinfo(cvdo, object)</code> returns lookup table coverage results and the execution count for each interpolation/extrapolation interval in the lookup table block <code>object</code>.</p> <p><code>[coverage, exeCounts, brkEquality] = tableinfo(cvdo, object)</code> returns lookup table coverage results, the execution count for each interpolation/extrapolation interval, and the execution counts for breakpoint equality.</p> |
| <b>Input Arguments</b> | <p><b>cvdo</b><br/>cvdata object</p> <p><b>ignore_descendants</b><br/>Logical value specifying whether to ignore the coverage of descendant objects</p> <ul style="list-style-type: none"><li>1 — Ignore coverage of descendant objects</li><li>0 — Collect coverage for descendant objects</li></ul> <p><b>object</b><br/>Full path or handle to a lookup table block or a model containing a lookup table block.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## Output Arguments

### **brkEquality**

A cell array containing vectors that identify the number of times during simulation that the lookup table block input was equivalent to a breakpoint value. Each vector represents the breakpoints along a different lookup table dimension.

### **coverage**

The value of `coverage` is a two-element vector of form `[covered_intervals total_intervals]`, the elements of which are:

|                                |                                                                      |
|--------------------------------|----------------------------------------------------------------------|
| <code>covered_intervals</code> | Number of interpolation/extrapolation intervals satisfied for object |
| <code>total_intervals</code>   | Total number of interpolation/extrapolation intervals for object     |

`coverage` is empty if `cvdo` does not contain lookup table coverage results for object.

### **exeCounts**

An array having the same dimensionality as the lookup table block; its size has been extended to allow for the lookup table extrapolation intervals.

## Examples

Collect lookup table coverage for the `slvndemo_cv_small_controller` model and determine the percentage of interpolation/extrapolation intervals coverage collected for the Gain Table block in the Gain subsystem:

```
mdl = 'slvndemo_cv_small_controller';
open_system(mdl)
%Create test spec object
testObj = cvtest(mdl)
%Enable lookup table coverage
```

```
testObj.settings.tableExec = 1;
%Simulate the model
data = cvsim(testObj)
blk_handle = get_param([mdl, '/Gain/Gain Table'], 'Handle');
%Retrieve l/u table coverage
cov = tableinfo(data, blk_handle)
%Percent MC/DC outcomes covered
percent_cov = 100 * cov(1) / cov(2)
```

## Alternatives

Use the Coverage Settings dialog box to collect lookup table coverage for a model:

- 1 Open the model.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** tab, select **Coverage for this model**.
- 4 Under **Coverage metrics**, select **Lookup Table**.
- 5 On the **Results** and **Reporting** tabs, specify the output you need.
- 6 Click **OK** to close the Coverage Settings dialog box and save your changes.
- 7 Simulate the model and review the results.

## See Also

[complexityinfo](#) | [conditioninfo](#) | [cvsim](#) | [decisioninfo](#) | [getCoverageInfo](#) | [mcdcinfo](#) | [overflowsaturationinfo](#) | [sigrangeinfo](#) | [sigsizeinfo](#)

## How To

- “Lookup Table Coverage”

# ModelAdvisor.ListViewParameter.Attributes property

---

**Purpose** Attributes to display in Model Advisor Report Explorer

**Values** Cell array

**Default:** {} (empty cell array)

**Description** The `Attributes` property specifies the attributes to display in the center pane of the Model Advisor Results Explorer.

## Examples

```
% define list view parameters
myLVParam = ModelAdvisor.ListViewParameter;
myLVParam.Name = 'Invalid font blocks'; % the name appeared at pull down filter
myLVParam.Data = get_param(searchResult,'object');
myLVParam.Attributes = {'FontName'}; % name is default property
```



# ModelAdvisor.Check.CallbackContext property

---

**Purpose** Specify when to run check

**Values** 'PostCompile'  
'None' (default)

**Description** The CallbackContext property specifies the context for checking the model or subsystem.

'None' No special requirements for the model before checking.

'Postcompile' The model must be compiled.

# ModelAdvisor.Check.CallbackHandle property

---

|                    |                                                                                  |
|--------------------|----------------------------------------------------------------------------------|
| <b>Purpose</b>     | Callback function handle for check                                               |
| <b>Values</b>      | Function handle.<br>An empty handle [ ] is the default.                          |
| <b>Description</b> | The CallbackHandle property specifies the handle to the check callback function. |

# ModelAdvisor.Check.CallbackStyle property

---

|                    |                                                                                                                                                                                                                                                                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Callback function type                                                                                                                                                                                                                                                |
| <b>Values</b>      | 'StyleOne' (default)<br>'StyleTwo'<br>'StyleThree'                                                                                                                                                                                                                    |
| <b>Description</b> | The CallbackStyle property specifies the type of the callback function.<br><br>'StyleOne'            Simple check callback function<br>'StyleTwo'           Detailed check callback function<br>'StyleThree'         Check callback function with hyperlinked results |

# ModelAdvisor.Check.EmitInputParametersToReport property

---

**Purpose** Display check input parameters in the Model Advisor report

**Values** 'true' (default)  
'false'

**Description** The EmitInputParametersToReport property specifies the display of check input parameters in the Model Advisor report.

|         |                                                                   |
|---------|-------------------------------------------------------------------|
| 'true'  | Display check input parameters in the Model Advisor report        |
| 'false' | Do not display check input parameters in the Model Advisor report |

# ModelAdvisor.ListViewParameter.Data property

---

**Purpose** Objects in Model Advisor Result Explorer

**Values** Array of Simulink objects  
**Default:** [] (empty array)

**Description** The Data property specifies the objects displayed in the Model Advisor Result Explorer.

**Examples**

```
% define list view parameters
myLVParam = ModelAdvisor.ListViewParameter;
myLVParam.Name = 'Invalid font blocks'; % the name appeared at pull down filter
myLVParam.Data = get_param(searchResult,'object');
```

# ModelAdvisor.Action.Description property

---

**Purpose** Message in **Action** box

**Values** String  
**Default:** ' ' (null string)

**Description** The Description property specifies the message displayed in the Action box.

**Examples**

```
% define action (fix) operation
myAction = ModelAdvisor.Action;
%Specify a callback function for the action
myAction.setCallbackFcn(@sampleActionCB);
myAction.Name='Fix block fonts';
myAction.Description=...
    'Click the button to update all blocks with specified font';
```

# ModelAdvisor.FactoryGroup.Description property

---

**Purpose** Description of folder

**Values** String

**Default:** '' (null string)

**Description** The Description property provides information about the folder. Details about the folder are displayed in the right pane of the Model Advisor.

**Examples**

```
% --- sample factory group
rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');
rec.Description='Sample Factory Group';
```

# ModelAdvisor.Group.Description property

---

**Purpose** Description of folder

**Values** String  
**Default:** '' (null string)

**Description** The Description property provides information about the folder. Details about the folder are displayed in the right pane of the Model Advisor.

**Examples**

```
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');  
MAG.Description='This is my group';
```



# ModelAdvisor.InputParameter.Description property

---

**Purpose** Description of input parameter

**Values** String.

**Default:** '' (null string)

**Description** The Description property specifies a description of the input parameter. Details about the check are displayed in the right pane of the Model Advisor.

**Examples**

```
% define input parameters
inputParam2 = ModelAdvisor.InputParameter;
inputParam2.Name = 'Standard font size';
inputParam2.Value='12';
inputParam2.Type='String';
inputParam2.Description='sample tooltip';
```

# ModelAdvisor.Task.Description property

---

**Purpose** Description of task

**Values** String  
**Default:** '' (null string)

**Description** The Description property is a description of the task that the Model Advisor displays in the **Analysis** box.

When adding checks as tasks, the Model Advisor uses the task Description property instead of the check TitleTips property.

## Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.DisplayName='Example task 1';  
MAT1.Description='This is the first example task.'
```

```
MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');  
MAT2.DisplayName='Example task 2';  
MAT2.Description='This is the second example task.'
```

```
MAT3 = ModelAdvisor.Task('com.mathworks.sample.TaskSample3');  
MAT3.DisplayName='Example task 3';  
MAT3.Description='This is the third example task.'
```

# ModelAdvisor.FactoryGroup.DisplayName property

---

|                    |                                                                                                                                                     |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Name of folder                                                                                                                                      |
| <b>Values</b>      | String<br><b>Default:</b> '' (null string)                                                                                                          |
| <b>Description</b> | The DisplayName specifies the name of the folder that is displayed in the Model Advisor.                                                            |
| <b>Examples</b>    | <pre>% --- sample factory group rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup'); rec.DisplayName='Sample Factory Group';</pre> |

# ModelAdvisor.Group.DisplayName property

---

**Purpose** Name of folder

**Values** String  
**Default:** ' ' (null string)

**Description** The DisplayName specifies the name of the folder that is displayed in the Model Advisor.

**Examples**

```
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');  
MAG.DisplayName='My Group';
```

# ModelAdvisor.Task.DisplayName property

---

**Purpose** Name of task

**Values** String  
**Default:** '' (null string)

**Description** The `DisplayName` property specifies the name of the task. The Model Advisor displays each custom task in the tree using the name of the task. Therefore, you should specify a unique name for each task. When you specify the same name for multiple tasks, the Model Advisor generates a warning.

When adding checks as tasks, the Model Advisor uses the task `DisplayName` property instead of the check `Title` property.

## Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.DisplayName='Example task with input parameter and auto-fix ability';
```

```
MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');  
MAT2.DisplayName='Example task 2';
```

```
MAT3 = ModelAdvisor.Task('com.mathworks.sample.TaskSample3');  
MAT3.DisplayName='Example task 3';
```

# ModelAdvisor.Check.Enable property

---

**Purpose** Indicate whether user can enable or disable check

**Values** true (default)  
false

**Description** The Enable property specifies whether the user can enable or disable the check.

|       |                               |
|-------|-------------------------------|
| true  | Display the check box control |
| false | Hide the check box control    |

# ModelAdvisor.Task.Enable property

---

## Purpose

Indicate if user can enable and disable task

## Values

true (default)  
false

## Description

The Enable property specifies whether the user can enable or disable a task.

|                |                                        |
|----------------|----------------------------------------|
| true (default) | Display the check box control for task |
| false          | Hide the check box control for task    |

When adding checks as tasks, the Model Advisor uses the task Enable property instead of the check Enable property.

## Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.Enable = 'false';
```

# ModelAdvisor.InputParameter.Entries property

---

**Purpose** Drop-down list entries

**Values** Depends on the value of the Type property.

**Description** The Entries property is valid only when the Type property is one of the following:

- Enum
- ComboBox
- PushButton

**Examples**

```
inputParam3 = ModelAdvisor.InputParameter;  
inputParam3.Name='Valid font';  
inputParam3.Type='Combobox';  
inputParam3.Description='sample tooltip';  
inputParam3.Entries={'Arial', 'Arial Black'};
```



# ModelAdvisor.Check.ID property

---

**Purpose** Identifier for check

**Values** String

**Default:** '' (null string)

**Description** The ID property specifies a permanent, unique identifier for the check. Note the following about the ID property:

- You must specify this property.
- The value of ID must remain constant.
- The Model Advisor generates an error if ID is not unique.
- Tasks and factory group definitions must refer to checks by ID.

# ModelAdvisor.FactoryGroup.ID property

---

**Purpose** Identifier for folder

**Values** String

**Description** The ID property specifies a permanent, unique identifier for the folder.

---

## Note

- You must specify this field.
  - The value of ID must remain constant.
  - The Model Advisor generates an error if ID is not unique.
  - Group definitions must refer to other groups by ID.
-

# ModelAdvisor.Group.ID property

---

**Purpose** Identifier for folder

**Values** String

**Description** The ID property specifies a permanent, unique identifier for the folder.

---

## Note

- You must specify this field.
  - The value of ID must remain constant.
  - The Model Advisor generates an error if ID is not unique.
  - Group definitions must refer to other groups by ID.
-

# ModelAdvisor.Task.ID property

---

**Purpose** Identifier for task

**Values** String  
**Default:** '' (null string)

**Description** The ID property specifies a permanent, unique identifier for the task.

---

## Note

- The Model Advisor automatically assigns a string to ID if you do not specify it.
  - The value of ID must remain constant.
  - The Model Advisor generates an error if ID is not unique.
  - Group definitions must refer to tasks using ID.
- 

## Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.ID='Task_ID_1234';
```

# ModelAdvisor.Check.LicenseName property

---

## Purpose

Product license names required to display and run check

## Values

Cell array of product license names

{ }(empty cell array) (default)

## Description

The `LicenseName` property specifies a cell array of names for product licenses required to display and run the check.

When the Model Advisor starts, it tests whether the product license exists. If you do not meet the license requirements, the Model Advisor does not display the check.

The Model Advisor performs a checkout of the product licenses when you run the custom check. If you do not have the product licenses available, you see an error message that the required license is not available.

---

**Tip** To find the text for license strings, type `help license` at the MATLAB command line.

---

# ModelAdvisor.Task.LicenseName property

---

**Purpose** Product license names required to display and run task

**Values** Cell array of product license names

**Default:** {} (empty cell array)

**Description** The `LicenseName` property specifies a cell array of names for product licenses required to display and run the check.

When the Model Advisor starts, it tests whether the product license exists. If you do not meet the license requirements, the Model Advisor does not display the check.

The Model Advisor performs a checkout of the product licenses when you run the custom check. If you do not have the product licenses available, you see an error message that the required license is not available.

If you specify `ModelAdvisor.Check.LicenseName`, the Model Advisor displays the check when the union of both properties is true.

---

**Tip** To find the text for license strings, type `help license` at the MATLAB command line.

---

# ModelAdvisor.Check.ListViewVisible property

---

**Purpose** Status of **Explore Result** button

**Values** false (default)  
true

**Description** The `ListViewVisible` property is a Boolean value that sets the status of the **Explore Result** button.

|       |                                           |
|-------|-------------------------------------------|
| true  | Display the <b>Explore Result</b> button. |
| false | Hide the <b>Explore Result</b> button.    |

**Examples**

```
% add 'Explore Result' button  
rec.ListViewVisible = true;
```

# ModelAdvisor.FactoryGroup.MAObj property

---

|                    |                                                                            |
|--------------------|----------------------------------------------------------------------------|
| <b>Purpose</b>     | Model Advisor object                                                       |
| <b>Values</b>      | Handle to a Simulink.ModelAdvisor object                                   |
| <b>Description</b> | The MAObj property specifies a handle to the current Model Advisor object. |



# ModelAdvisor.Group.MAObj property

---

|                    |                                                                            |
|--------------------|----------------------------------------------------------------------------|
| <b>Purpose</b>     | Model Advisor object                                                       |
| <b>Values</b>      | Handle to Simulink.ModelAdvisor object                                     |
| <b>Description</b> | The MAObj property specifies a handle to the current Model Advisor object. |

# ModelAdvisor.Task.MAObj property

---

|                    |                                                                                                                                                                                               |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Model Advisor object                                                                                                                                                                          |
| <b>Values</b>      | Handle to a Simulink.ModelAdvisor object                                                                                                                                                      |
| <b>Description</b> | <p>The MAObj property specifies the current Model Advisor object.</p> <p>When adding checks as tasks, the Model Advisor uses the task MAObj property instead of the check MAObj property.</p> |

## cv.cvdatagroup.name property

---

**Purpose** cv.cvdatagroup object name

**Values** name

**Description** The name property specifies the name of the cv.cvdatagroup object.

**Examples**

```
cvdg = cvsim(topModelName);  
cvdg.name = 'My_Data_Group';
```

# ModelAdvisor.Action.Name property

---

**Purpose** Action button label

**Values** String  
**Default:** '' (null string)

**Description** The Name property specifies the label for the action button. This property is required.

**Examples**

```
% define action (fix) operation
myAction = ModelAdvisor.Action;
%Specify a callback function for the action
myAction.setCallbackFcn(@sampleActionCB);
myAction.Name='Fix block fonts';
```

# ModelAdvisor.InputParameter.Name property

---

|                    |                                                                                                                                                                                                             |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Input parameter name                                                                                                                                                                                        |
| <b>Values</b>      | String.<br><b>Default:</b> '' (null string)                                                                                                                                                                 |
| <b>Description</b> | The Name property specifies the name of the input parameter in the custom check.                                                                                                                            |
| <b>Examples</b>    | <pre>inputParam2 = ModelAdvisor.InputParameter;<br/>inputParam2.Name = 'Standard font size';<br/>inputParam2.Value='12';<br/>inputParam2.Type='String';<br/>inputParam2.Description='sample tooltip';</pre> |

# ModelAdvisor.ListViewParameter.Name property

---

**Purpose** Drop-down list entry

**Values** String  
**Default:** '' (null string)

**Description** The Name property specifies an entry in the **Show** drop-down list in the Model Advisor Result Explorer.

**Examples**

```
% define list view parameters
myLVParam = ModelAdvisor.ListViewParameter;
myLVParam.Name = 'Invalid font blocks'; % the name appeared at pull down filter
```

# ModelAdvisor.Check.Result property

---

**Purpose** Results cell array

**Values** Cell array

**Default:** {} (empty cell array)

**Description** The `Result` property specifies the cell array for storing the results that are returned by the callback function specified in `CallbackHandle`.

---

**Tip** To set the icon associated with the check, use the `Simulink.ModelAdvisor` `setCheckResultStatus` and `setCheckErrorSeverity` methods.

---

# ModelAdvisor.Check.supportExclusion property

---

|                    |                                                                                                                                                                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Set to support exclusions                                                                                                                                             |
| <b>Values</b>      | Boolean value specifying that the check supports exclusions.<br><br>true The check supports exclusions.<br>false (default). The check does not support exclusions.    |
| <b>Description</b> | The supportExclusion property specifies whether the check supports exclusions.<br><br>'true' Check supports exclusions.<br>'false' Check does not support exclusions. |
| <b>Examples</b>    | <pre>% specify that a check supports exclusions rec = ModelAdvisor.Check('com.mathworks.sample.Check1'); rec.supportExclusion = true;</pre>                           |



# ModelAdvisor.Check.SupportLibrary property

---

|                    |                                                                                                                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Set to support library models                                                                                                                                                                                            |
| <b>Values</b>      | Boolean value specifying that the check supports library models.<br><br>true. The check supports library models.<br>false (default). The check does not support library models.                                          |
| <b>Description</b> | The SupportLibrary property specifies whether the check supports library models.<br><br>'true'                      Check supports library models.<br>'false'                     Check does not support library models. |
| <b>Examples</b>    | <pre>% specify that a check supports library models rec = ModelAdvisor.Check('com.mathworks.sample.Check1'); rec.SupportLibrary = true;</pre>                                                                            |

# ModelAdvisor.Check.Title property

---

**Purpose** Name of check

**Values** String  
**Default:** '' (null string)

**Description** The Title property specifies the name of the check in the Model Advisor. The Model Advisor displays each custom check in the tree using the title of the check. Therefore, you should specify a unique title for each check. When you specify the same title for multiple checks, the Model Advisor generates a warning.

**Examples**

```
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');  
rec.Title = 'Check Simulink block font';
```

# ModelAdvisor.Check.TitleTips property

---

**Purpose** Description of check

**Values** String

**Default:** '' (null string)

**Description** The TitleTips property specifies a description of the check. Details about the check are displayed in the right pane of the Model Advisor.

**Examples**

```
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');  
rec.Title = 'Check Simulink block font';  
rec.TitleTips = 'Example style three callback';
```

# ModelAdvisor.InputParameter.Type property

---

**Purpose** Input parameter type

**Values** String.

**Default:** '' (null string)

**Description** The Type property specifies the type of input parameter.

Use the Type property with the Value and Entries properties to define input parameters.

Valid values are listed in the following table.

| Type     | Data Type  | Default Value           | Description                                                                                                                                                                                                         |
|----------|------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bool     | Boolean    | false                   | A check box                                                                                                                                                                                                         |
| ComboBox | Cell array | First entry in the list | A drop-down menu <ul style="list-style-type: none"><li>• Use Entries to define the entries in the list.</li><li>• Use Value to indicate a specific entry in the menu or to enter a value not in the list.</li></ul> |
| Enum     | Cell array | First entry in the list | A drop-down menu <ul style="list-style-type: none"><li>• Use Entries to define the entries in the list.</li><li>• Use Value to indicate a specific entry in the list.</li></ul>                                     |

# ModelAdvisor.InputParameter.Type property

| Type       | Data Type | Default Value     | Description                                                                                                   |
|------------|-----------|-------------------|---------------------------------------------------------------------------------------------------------------|
| PushButton | N/A       | N/A               | A button<br><br>When you click the button, the callback function specified by <code>Entries</code> is called. |
| String     | String    | ' ' (null string) | A text box                                                                                                    |

## Examples

```
% define input parameters
inputParam1 = ModelAdvisor.InputParameter;
inputParam1.Name = 'Skip font checks.';
inputParam1.Type = 'Bool';
inputParam1.Value = false;
```

# Advisor.authoring.DataFile.validate

---

|                        |                                                                                                                                                                                                           |                       |                             |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------|
| <b>Purpose</b>         | Validate XML data file used for model configuration check                                                                                                                                                 |                       |                             |
| <b>Syntax</b>          | <code>msg = Advisor.authoring.DataFile.validate(dataFile)</code>                                                                                                                                          |                       |                             |
| <b>Description</b>     | <code>msg = Advisor.authoring.DataFile.validate(dataFile)</code> validates the syntax of the XML data file used for model configuration checks.                                                           |                       |                             |
| <b>Input Arguments</b> | <table><tr><td><code>dataFile</code></td><td>XML data file name (string)</td></tr></table>                                                                                                                | <code>dataFile</code> | XML data file name (string) |
| <code>dataFile</code>  | XML data file name (string)                                                                                                                                                                               |                       |                             |
| <b>Examples</b>        | <pre>dataFile = 'myDataFile.xml'; msg = Advisor.authoring.DataFile.validate(dataFile);  if isempty(msg)     disp('Data file passed the XSD schema validation.');</pre> <pre>else     disp(msg); end</pre> |                       |                             |
| <b>See Also</b>        | <code>Advisor.authoring.CustomCheck</code>  <br><code>Advisor.authoring.generateConfigurationParameterDataFile</code>                                                                                     |                       |                             |
| <b>How To</b>          | <ul style="list-style-type: none"><li>• “Create Check for Model Configuration Parameters”</li></ul>                                                                                                       |                       |                             |

# ModelAdvisor.Check.Value property

---

|                    |                                                                                                                                                                                             |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Status of check                                                                                                                                                                             |
| <b>Values</b>      | 'true' (default)<br>'false'                                                                                                                                                                 |
| <b>Description</b> | The Value property specifies the initial status of the check.<br><br>'true'                      Check is enabled<br>'false'                     Check is disabled                          |
| <b>Examples</b>    | <pre>% hide all checks that do not belong to Demo group if ~(strcmp(checkCellArray{i}.Group, 'Demo'))     checkCellArray{i}.Visible = false;     checkCellArray{i}.Value = false; end</pre> |

# ModelAdvisor.InputParameter.Value property

---

**Purpose** Value of input parameter

**Values** Depends on the Type property.

**Description** The Value property specifies the initial value of the input parameter. This property is valid only when the Type property is one of the following:

- 'Bool'
- 'String'
- 'Enum'
- 'ComboBox'

**Examples**

```
% define input parameters
inputParam1 = ModelAdvisor.InputParameter;
inputParam1.Name = 'Skip font checks.';
inputParam1.Type = 'Bool';
inputParam1.Value = false;
```



# ModelAdvisor.Task.Value property

---

|                    |                                                                                                                                                                                                                             |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>     | Status of task                                                                                                                                                                                                              |
| <b>Values</b>      | 'true' (default) — Initial status of task is enabled<br>'false' — Initial status of task is disabled                                                                                                                        |
| <b>Description</b> | <p>The Value property indicates the initial status of a task—whether it is enabled or disabled.</p> <p>When adding checks as tasks, the Model Advisor uses the task Value property instead of the check Value property.</p> |
| <b>Examples</b>    | <pre>MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');<br/>MAT1.Value = 'false';</pre>                                                                                                                          |

# view

---

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>         | View Model Advisor run results for checks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Syntax</b>          | <code>view(CheckResultObj)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>     | <code>view(CheckResultObj)</code> opens a web browser and displays the results of the check specified by <code>CheckResultObj</code> . <code>CheckResultObj</code> is a <code>ModelAdvisor.CheckResult</code> object returned by <code>ModelAdvisor.run</code> .                                                                                                                                                                                                                                                                                                                                                   |
| <b>Input Arguments</b> | <b>CheckResultObj</b><br><code>ModelAdvisor.CheckResult</code> object which is a part of a <code>ModelAdvisor.SystemResult</code> object returned by <code>ModelAdvisor.run</code> .                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Examples</b>        | View the Model Advisor run results for the first check in the <code>slvndemo_mdldv_config</code> configuration file:<br><br><pre>% Identify Model Advisor configuration file.<br/>% Create list of models to run.<br/>fileName = 'slvndemo_mdldv_config.mat';<br/>SysList={'sldemo_auto_climatecontrol/Heater Control',...<br/>        'sldemo_auto_climatecontrol/AC Control'};<br/><br/>% Run the Model Advisor.<br/>SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',fileName);<br/><br/>% View the 'Identify unconnected...' check result.<br/>view(SysResultObjArray{1}.CheckResultObjs(1))</pre> |
| <b>Alternatives</b>    | “View Model Advisor Report”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>See Also</b>        | <code>ModelAdvisor.run</code>   <code>ModelAdvisor.summaryReport</code>   <code>viewReport</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Tutorials</b>       | <ul style="list-style-type: none"><li>• “Workflow for Checking Systems Programmatically”</li><li>• “Check Multiple Systems in Parallel”</li><li>• “Create a Function for Checking Multiple Systems in Parallel”</li></ul>                                                                                                                                                                                                                                                                                                                                                                                          |

**How To**

- “Automating Check Execution”
- “Archive and View Model Advisor Run Results”

# viewReport

---

**Purpose** View Model Advisor run results for systems

**Syntax**  
`viewReport(SysResultObjArray)`  
`viewReport(SysResultObjArray, 'MA')`  
`viewReport(SysResultObjArray, 'Cmd')`

**Description** `viewReport(SysResultObjArray)` opens the Model Advisor Report for the system specified by `SysResultObjArray`. `SysResultObjArray` is a `ModelAdvisor.SystemResult` object returned by `ModelAdvisor.run`.

`viewReport(SysResultObjArray, 'MA')` opens the Model Advisor and displays the results of the run for the system specified by `SysResultObjArray`.

`viewReport(SysResultObjArray, 'Cmd')` displays the Model Advisor run summary in the Command Window for the systems specified by `SysResultObjArray`.

**Input Arguments**

**SysResultObjArray**

`ModelAdvisor.SystemResult` object returned by `ModelAdvisor.run`.

**Examples**

Open the Model Advisor report for `sldemo_auto_climatecontrol/Heater Control`.

```
% Identify Model Advisor configuration file.
% Create list of models to run.
fileName = 'slvndemo_mdldv_config.mat';
SysList={'sldemo_auto_climatecontrol/Heater Control',...
        'sldemo_auto_climatecontrol/AC Control'};

% Run the Model Advisor.
SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',fileName);

% Open the Model Advisor report.
viewReport(SysResultObjArray{1})
```

---

Open Model Advisor and display results for  
sldemo\_auto\_climatecontrol/Heater Control.

```
% Identify Model Advisor configuration file.
% Create list of models to run.
fileName = 'slvndemo_mdldv_config.mat';
SysList={'sldemo_auto_climatecontrol/Heater Control',...
         'sldemo_auto_climatecontrol/AC Control'};

% Run the Model Advisor.
SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',fileName);

% Open the Model Advisor and display results.
viewReport(SysResultObjArray{1}, 'MA')
```

---

Display results in the Command Window for  
sldemo\_auto\_climatecontrol/Heater Control.

```
% Identify Model Advisor configuration file.
% Create list of models to run.
fileName = 'slvndemo_mdldv_config.mat';
SysList={'sldemo_auto_climatecontrol/Heater Control',...
         'sldemo_auto_climatecontrol/AC Control'};

% Run the Model Advisor.
SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',fileName);

% Display results in the Command Window.
viewReport(SysResultObjArray{1}, 'Cmd')
```

## Alternatives

- “View Model Advisor Report”
- “View Results in Model Advisor GUI”
- “View Results in Command Window”

## See Also

[ModelAdvisor.run](#) | [ModelAdvisor.summaryReport](#) | [view](#)

## **Tutorials**

- “Workflow for Checking Systems Programmatically”
- “Check Multiple Systems in Parallel”
- “Create a Function for Checking Multiple Systems in Parallel”

## **How To**

- “Automating Check Execution”
- “Archive and View Model Advisor Run Results”

# ModelAdvisor.Check.Visible property

---

## Purpose

Indicate to display or hide check

## Values

'true' (default)  
'false'

## Description

The `Visible` property specifies whether the Model Advisor displays the check.

|         |                   |
|---------|-------------------|
| 'true'  | Display the check |
| 'false' | Hide the check    |

## Examples

```
% hide all checks that do not belong to Demo group
if ~(strcmp(checkCellArray{i}.Group, 'Demo'))
    checkCellArray{i}.Visible = false;
    checkCellArray{i}.Value = false;
end
```

# ModelAdvisor.Task.Visible property

---

**Purpose** Indicate to display or hide task

**Values** 'true' (default) — Display task in the Model Advisor  
'false' — Hide task

**Description** The `Visible` property specifies whether the Model Advisor displays the task.

---

## Caution

When adding checks as tasks, you cannot specify both the task and check `Visible` properties, you must specify one or the other. If you specify both properties, the Model Advisor generates an error when the check `Visible` property is `false`.

---

**Examples**

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.Visible = 'false';
```



# Block Reference

---

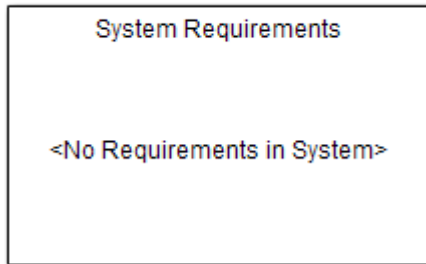
# System Requirements

---

**Purpose** List system requirements in Simulink diagrams

**Library** Simulink Verification and Validation

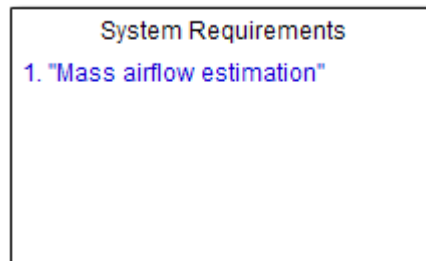
## Description



The System Requirements block lists all the system requirements associated with the model or subsystem depicted in the current diagram. It does not list requirements associated with individual blocks in the diagram.

You can place this block anywhere in a diagram. It is not connected to other Simulink blocks. You can only have one System Requirements block in a diagram.

When you drag the System Requirements block from the Library Browser into your Simulink diagram, it is automatically populated with the system requirements, as shown.

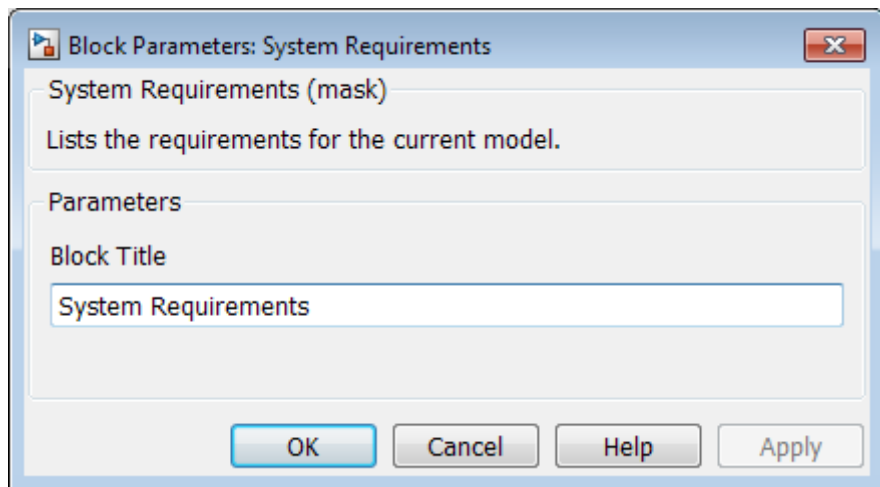


Each of the listed requirements is an active link to the actual requirements document. When you double-click on a requirement name, the associated requirements document opens in its editor window, scrolled to the target location.

If the System Requirements block exists in a diagram, it automatically updates the requirements listing as you add, modify, or delete requirements for the model or subsystem.

## Dialog Box and Parameters

To access the Block Parameters dialog box for the System Requirements block, right-click on the System Requirements block and, from the context menu, select **Mask Parameters**. The Block Parameters dialog box opens, as shown.



The Block Parameters dialog box for the System Requirements block contains one parameter.

### Block Title

The title of the system requirements list in the diagram. The default title is `System Requirements`. You can type a customized title, for example, `Engine Requirements`.

# System Requirements

---

# Model Advisor Checks

---

- “Simulink® Verification and Validation™ Checks” on page 3-2
- “DO-178C/DO-331 Checks” on page 3-7
- “IEC 61508, ISO 26262, and EN 50128 Checks” on page 3-88
- “MathWorks Automotive Advisory Board Checks” on page 3-126
- “Requirements Consistency Checks” on page 3-196

## Simulink Verification and Validation Checks

**In this section...**

“Simulink® Verification and Validation™ Checks Overview” on page 3-2

“Modeling Standards Checks Overview” on page 3-3

“Modeling Standards for MAAB Overview” on page 3-3

“Naming Conventions Overview” on page 3-4

“Model Architecture Overview” on page 3-4

“Model Configuration Options Overview” on page 3-5

“Simulink Overview” on page 3-5

“Stateflow Overview” on page 3-5

“MATLAB Functions Overview” on page 3-6

### Simulink Verification and Validation Checks Overview

Simulink Verification and Validation checks facilitate designing and troubleshooting models from which code is generated for applications that must meet safety or mission-critical requirements, modeling guidelines, or requirements consistency.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the Simulink Verification and Validation checks.

For descriptions of the modeling standards checks, see

- “DO-178C/DO-331 Checks” on page 3-7
- “IEC 61508, ISO 26262, and EN 50128 Checks” on page 3-88
- “MathWorks Automotive Advisory Board Checks” on page 3-126

For descriptions of the requirements consistency checks, see “Requirements Consistency Checks” on page 3-196.

## See Also

- “Consult the Model Advisor”
- “Simulink Checks”
- “Simulink Coder™ Checks”

## Modeling Standards Checks Overview

Modeling standards checks facilitate designing and troubleshooting models from which code is generated for applications that must meet safety or mission-critical requirements or MathWorks® Automotive Advisory Board (MAAB) modeling guidelines.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the modeling standards checks.

For descriptions of the modeling standards checks, see

- “DO-178C/DO-331 Checks” on page 3-7
- “IEC 61508, ISO 26262, and EN 50128 Checks” on page 3-88
- “MathWorks Automotive Advisory Board Checks” on page 3-126

## See Also

- “Consult the Model Advisor”
- “Simulink Checks”
- “Simulink Coder Checks”

## Modeling Standards for MAAB Overview

Group of MathWorks Automotive Advisory Board (MAAB) checks. MAAB checks facilitate designing and troubleshooting models from which code is generated for automotive applications.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the modeling standards for MAAB checks.

### See Also

- “Consult the Model Advisor”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

### Naming Conventions Overview

Group of MathWorks Automotive Advisory Board (MAAB) checks related to naming conventions.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the naming conventions checks.

### See Also

- “Consult the Model Advisor”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

### Model Architecture Overview

Group of MathWorks Automotive Advisory Board (MAAB) checks related to model architecture.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the model architecture checks.

### See Also

- “Consult the Model Advisor”
- “Simulink Checks”
- “Simulink Coder Checks”



- “MAAB Control Algorithm Modeling” guidelines

## **Model Configuration Options Overview**

Group of MathWorks Automotive Advisory Board (MAAB) checks related to model configuration options.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the model configuration options checks.

### **See Also**

- “Consult the Model Advisor”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

## **Simulink Overview**

Group of MathWorks Automotive Advisory Board (MAAB) checks related to the Simulink product.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the MAAB checks related to the Simulink product.

### **See Also**

- “Consult the Model Advisor”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

## **Stateflow Overview**

Group of MathWorks Automotive Advisory Board (MAAB) checks related to the Stateflow product.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the MAAB checks related to the Stateflow product.

### **See Also**

- “Consult the Model Advisor”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

### **MATLAB Functions Overview**

MathWorks Automotive Advisory Board (MAAB) checks related to MATLAB functions.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the MAAB checks related to MATLAB functions.

### **See Also**

- “Consult the Model Advisor”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

## DO-178C/DO-331 Checks

### In this section...

“DO-178C/DO-331 Checks Overview” on page 3-8

“Check safety-related optimization settings” on page 3-10

“Check safety-related diagnostic settings for solvers” on page 3-14

“Check safety-related diagnostic settings for sample time” on page 3-17

“Check safety-related diagnostic settings for signal data” on page 3-20

“Check safety-related diagnostic settings for parameters” on page 3-23

“Check safety-related diagnostic settings for data used for debugging” on page 3-26

“Check safety-related diagnostic settings for data store memory” on page 3-28

“Check safety-related diagnostic settings for type conversions” on page 3-30

“Check safety-related diagnostic settings for signal connectivity” on page 3-32

“Check safety-related diagnostic settings for bus connectivity” on page 3-34

“Check safety-related diagnostic settings that apply to function-call connectivity” on page 3-36

“Check safety-related diagnostic settings for compatibility” on page 3-38

“Check safety-related diagnostic settings for model initialization” on page 3-40

“Check safety-related diagnostic settings for model referencing” on page 3-43

“Check safety-related model referencing settings” on page 3-46

“Check safety-related code generation settings” on page 3-48

“Check safety-related diagnostic settings for saving” on page 3-55

“Check for blocks that do not link to requirements” on page 3-57

“Check usage of Math blocks” on page 3-58

“Check state machine type of Stateflow charts” on page 3-60

**In this section...**

“Check Stateflow charts for ordering of states and transitions” on page 3-62

“Check Stateflow debugging options” on page 3-64

“Check usage of lookup table blocks” on page 3-66

“Check MATLAB Code Analyzer messages” on page 3-68

“Check MATLAB code for global variables” on page 3-70

“Check for inconsistent vector indexing methods” on page 3-71

“Check for MATLAB Function block interfaces with inherited properties” on page 3-72

“Check MATLAB Function block metrics” on page 3-74

“Check for blocks not recommended for C/C++ production code deployment” on page 3-76

“Check Stateflow charts for uniquely defined data objects” on page 3-77

“Check usage of Math Operations blocks” on page 3-78

“Check usage of Signal Routing blocks” on page 3-81

“Check usage of Logic and Bit Operations blocks” on page 3-82

“Check usage of Ports and Subsystems blocks” on page 3-84

“Display model version information” on page 3-87

## **DO-178C/DO-331 Checks Overview**

DO-178C/DO-331 checks facilitate designing and troubleshooting models from which code is generated for applications that must meet safety or mission-critical requirements.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the DO-178C/DO-331 checks.

### **See Also**

- “Consult the Model Advisor”

- “Simulink Checks”
- “Simulink Coder Checks”
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related optimization settings

Check model configuration for optimization settings that can impact safety.

### Description

This check verifies that model optimization configuration parameters are set optimally for generating code for a safety-related application. Although highly optimized code is desirable for most real-time systems, some optimizations can have undesirable side effects that impact safety.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                  | Recommended Action                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Block reduction optimization is selected. This optimization can remove blocks from generated code, resulting in requirements without associated code and violations for traceability requirements. (See DO-331, Section MB.6.3.4.e—Source code is traceable to low-level requirements.)                    | Clear the <b>Block reduction</b> check box on the <b>Optimization</b> pane of the Configuration Parameters dialog box or set the parameter <code>BlockReduction</code> to off.                         |
| Implementation of logic signals as Boolean data is cleared. Strong data typing is recommended for safety-related code. (See DO-331, Section MB.6.3.1.e—High-level requirements conform to standards, DO-331, Section MB.6.3.2.e—Low-level requirements conform to standards, and MISRA-C:2004, Rule 12.6.) | Select <b>Implement logic signals as boolean data (vs. double)</b> on the <b>Optimization</b> pane of the Configuration Parameters dialog box or set the parameter <code>BooleanDataType</code> to on. |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The model includes blocks that depend on elapsed or absolute time and is configured to minimize the amount of memory allocated for the timers. Such a configuration limits the number of days the application can execute before a timer overflow occurs. Many aerospace products are powered on continuously and timers should not assume a limited lifespan. (See DO-331, Section MB.6.3.1.g—Algorithms are accurate, DO-331, Section MB.6.3.2.g—Algorithms are accurate, and MISRA-C:2004, Rule 12.11.)</p> | <p>Set <b>Application lifespan (days)</b> on the <b>Optimization</b> pane of the Configuration Parameters dialog box or set the parameter LifeSpan to inf.</p>                                                                                                                                                                                                                                                        |
| <p>The optimization that suppresses the generation of initialization code for root-level inports and outports that are set to zero is selected. For safety-related code, you should explicitly initialize all variables. (See DO-331, Section MB.6.3.3.b—Software architecture is consistent and MISRA-C:2004, Rule 9.1.)</p>                                                                                                                                                                                     | <p>If you have a Embedded Coder license, and you are using an ERT-based system target file, clear the <b>Remove root level I/O zero initialization</b> check box on the <b>Optimization</b> pane of the Configuration Parameters dialog box or set the parameter ZeroExternalMemoryAtStartup to on. Alternatively, integrate external, hand-written code that initializes all I/O variables to zero explicitly.</p>   |
| <p>The optimization that suppresses the generation of initialization code for internal work structures, such as block states and block outputs that are set to zero, is selected. For safety-related code, you should explicitly initialize every variable. (See DO-331, Section MB.6.3.3.b—Software architecture is consistent and MISRA-C:2004, Rule 9.1.)</p>                                                                                                                                                  | <p>If you have a Embedded Coder license, and you are using an ERT-based system target file, clear the <b>Remove internal data zero initialization</b> check box on the <b>Optimization</b> pane of the Configuration Parameters dialog box or set the parameter ZeroInternalMemoryAtStartup to on. Alternatively, integrate external, hand-written code that initializes every state variable to zero explicitly.</p> |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Recommended Action                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The optimization that suppresses generation of code resulting from floating-point to integer conversions that wrap out-of-range values is cleared. You must avoid overflows for safety-related code. When this optimization is off and your model includes blocks that disable the <b>Saturate on overflow</b> parameter, the code generator wraps out-of-range values for those blocks. This can result in unreachable and, therefore, untestable code. (See DO-331, Section MB.6.3.1.g—Algorithms are accurate, DO-331, Section MB.6.3.2.g—Algorithms are accurate, and MISRA-C:2004, Rule 12.11.)</p> | <p>If you have a Simulink Coder license, select <b>Remove code from floating-point to integer conversions that wraps out-of-range values</b> on the <b>Optimization</b> pane of the Configuration Parameters dialog box or set the parameter <code>EfficientFloat2IntCast</code> to on.</p>                                                  |
| <p>The optimization that suppresses generation of code that guards against division by zero for fixed-point data is selected. You must avoid division-by-zero exceptions in safety-related code. (See DO-331, Section MB.6.3.1.g—Algorithms are accurate, DO-331, Section MB.6.3.2.g—Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p>                                                                                                                                                                                                                                                             | <p>If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the <b>Remove code that protects against division arithmetic exceptions</b> check box on the <b>Optimization</b> pane of the Configuration Parameters dialog box or set the parameter <code>NoFixptDivByZeroProtection</code> to off.</p> |
| <p>The optimization that uses the specified minimum and maximum values for signals and parameters to optimize the generated code is selected. This might result in requirements without traceable code. (See DO-331 Section MB.6.3.4.e - Source code is traceable to low-level requirements.)</p>                                                                                                                                                                                                                                                                                                           | <p>If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the <b>“Optimize using the specified minimum and maximum values”</b> check box on the <b>Optimization</b> pane of the Configuration Parameters dialog box.</p>                                                                            |

### Action Results

Clicking **Modify Settings** configures model optimization settings that can impact safety.



Subchecks depend on the results of the subchecks noted with **D** in the results table in the Model Advisor window.

### **See Also**

- “Optimization Pane: General” in the Simulink graphical user interface documentation
- “Optimize Buffers in the Generated Code” in the Simulink Coder documentation
- “Optimize Generated Code Using Specified Minimum and Maximum Values” in the Embedded Coder documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for solvers

Check model configuration for diagnostic settings that apply to solvers and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to solvers are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                | Recommended Action                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic for detecting automatic breakage of algebraic loops is set to none or warning. The breaking of algebraic loops can affect the predictability of the order of block execution. For safety-related applications, a model developer needs to know when such breaks occur. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p>                                                             | <p>Set <b>Algebraic loop</b> on the <b>Diagnostics &gt; Solver</b> pane of the Configuration Parameters dialog box or set the parameter AlgebraicLoopMsg to error. Consider breaking such loops explicitly with Unit Delay blocks so that the execution order is predictable. At a minimum, verify that the results of loops breaking automatically are acceptable.</p>                    |
| <p>The diagnostic for detecting automatic breakage of algebraic loops for Model blocks, atomic subsystems, and enabled subsystems is set to none or warning. The breaking of algebraic loops can affect the predictability of the order of block execution. For safety-related applications, a model developer needs to know when such breaks occur. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set <b>Minimize algebraic loop</b> on the <b>Diagnostics &gt; Solver</b> pane of the Configuration Parameters dialog box or set the parameter ArtificialAlgebraicLoopMsg to error. Consider breaking such loops explicitly with Unit Delay blocks so that the execution order is predictable. At a minimum, verify that the results of loops breaking automatically are acceptable.</p> |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                | Recommended Action                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic for detecting potential conflict in block execution order is set to none or warning. For safety-related applications, block execution order must be predictable. A model developer needs to know when conflicting block priorities exist. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p>                                                                                                                  | <p>Set <b>Block priority violation</b> on the <b>Diagnostics &gt; Solver</b> pane of the Configuration Parameters dialog box or set the parameter BlockPriorityViolationMsg to error.</p>            |
| <p>The diagnostic for detecting whether a model contains an S-function that has not been specified explicitly to inherit sample time is set to none or warning. These settings can result in unpredictable behavior. A model developer needs to know when such an S-function exists in a model so it can be modified to produce predictable behavior. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p>                | <p>Set <b>Unspecified inheritability of sample times</b> on the <b>Diagnostics &gt; Solver</b> pane of the Configuration Parameters dialog box or set the parameter UnknownTsInhSupMsg to error.</p> |
| <p>The diagnostic for detecting whether the Simulink software automatically modifies the solver, step size, or simulation stop time is set to none or warning. Such changes can affect the operation of generated code. For safety-related applications, it is better to detect such changes so a model developer can explicitly set the parameters to known values. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set <b>Automatic solver parameter selection</b> on the <b>Diagnostics &gt; Solver</b> pane of the Configuration Parameters dialog box or set the parameter SolverPrmCheckMsg to error.</p>        |
| <p>The diagnostic for detecting when a name is used for more than one state in the model is set to none. State names within a model should be unique. For safety-related applications, it is better to detect name clashes so a model developer can fix them. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p>                                                                                                                | <p>Set <b>State name clash</b> on the <b>Diagnostics &gt; Solver</b> pane of the Configuration Parameters dialog box or set the parameter StateNameClashWarn to warning.</p>                         |

### **Action Results**

Clicking **Modify Settings** configures model diagnostic settings that apply to solvers and that can impact safety.

### **See Also**

- “Diagnostics Pane: Solver” in the Simulink graphical user interface documentation
- “Manage Errors and Warnings” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for sample time

Check model configuration for diagnostic settings that apply to sample time and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to sample times are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Recommended Action                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic for detecting when a source block, such as a Sine Wave block, inherits a sample time (specified as -1) is set to none or warning. The use of inherited sample times for a source block can result in unpredictable execution rates for the source block and blocks connected to it. For safety-related applications, source blocks should have explicit sample times to prevent incorrect execution sequencing. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set <b>Source block specifies -1 sample time</b> on the <b>Diagnostics &gt; Sample Time</b> pane of the Configuration Parameters dialog box or set the parameter <code>InheritedTsInSrcMsg</code> to error.</p> |
| <p>The diagnostic for detecting whether the input for a discrete block, such as the Unit Delay block, is a continuous signal is set to none or warning. Signals with continuous sample times should not be used for embedded real-time code. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p>                                                                                                                                                                                      | <p>Set <b>Discrete used as continuous</b> on the <b>Diagnostics &gt; Sample Time</b> pane of the Configuration Parameters dialog box or set the parameter <code>DiscreteInheritContinuousMsg</code> to error.</p>  |

| <b>Condition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Recommended Action</b>                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic for detecting invalid rate transitions between two blocks operating in multitasking mode is set to none or warning. Such rate transitions should not be used for embedded real-time code. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p>                                                                                                                                                                                              | <p>Set <b>Multitask rate transition</b> on the <b>Diagnostics &gt; Sample Time</b> pane of the Configuration Parameters dialog box or set the parameter <code>MultiTaskRateTransMsg</code> to error.</p>                                          |
| <p>The diagnostic for detecting subsystems that can cause data corruption or nondeterministic behavior is set to none or warning. This diagnostic detects whether conditionally executed multirate subsystems (enabled, triggered, or function-call subsystems) operate in multitasking mode. Such subsystems can corrupt data and behave unpredictably in real-time environments that allow preemption. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set <b>Multitask conditionally executed subsystem</b> on the <b>Diagnostics &gt; Sample Time</b> pane of the Configuration Parameters dialog box or set the parameter <code>MultiTaskCondExecSysMsg</code> to error.</p>                       |
| <p>The diagnostic for checking sample time consistency between a Signal Specification block and the connected destination block is set to none or warning. An over-specified sample time can result in an unpredictable execution rate. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p>                                                                                                                                                          | <p>Set <b>Enforce sample times specified by Signal Specification blocks</b> on the <b>Diagnostics &gt; Sample Time</b> pane of the Configuration Parameters dialog box or set the parameter <code>SigSpecEnsureSampleTimeMsg</code> to error.</p> |

**Action Results**

Clicking **Modify Settings** configures model diagnostic settings that apply to sample time and that can impact safety.

**See Also**

- “Diagnostics Pane: Sample Time” in the Simulink graphical user interface documentation
- “Manage Errors and Warnings” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for signal data

Check model configuration for diagnostic settings that apply to signal data and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to signal data are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                         | Recommended Action                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic that specifies how the Simulink software resolves signals associated with Simulink.Signal objects in the MATLAB workspace is set to <b>Explicit and implicit</b> or <b>Explicit and warn implicit</b>. For safety-related applications, model developers should be required to define signal resolution explicitly. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set <b>Signal resolution</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>SignalResolutionControl</code> to <b>Explicit only</b>. This provides predictable operation by requiring users to define each signal and block setting that must resolve to <code>Simulink.Signal</code> objects in the workspace.</p> |
| <p>The Product block diagnostic that detects a singular matrix while inverting one of its inputs in matrix multiplication mode is set to <b>none</b> or <b>warning</b>. Division by a singular matrix can result in numeric exceptions when executing generated code.</p>                                                                                                                                         | <p>Set <b>Division by singular matrix</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>CheckMatrixSingularityMsg</code> to <b>error</b>.</p>                                                                                                                                                                        |



| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Recommended Action                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>This is not acceptable in safety-related systems. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p>                                                                                                                                                                                                                                                      |                                                                                                                                                                                                   |
| <p>The diagnostic that detects when the Simulink software cannot infer the data type of a signal during data type propagation is set to none or warning. For safety-related applications, model developers must verify the data types of signals. (See DO-331, Section MB.6.3.1.e – High-level requirements conform to standards, and DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards.)</p>                                         | <p>Set <b>Underspecified data types</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter UnderSpecifiedDataTypeMsg to error.</p> |
| <p>The diagnostic that detects whether the value of a signal or parameter is too large to be represented by the signal or parameter’s data type is set to none or warning. Undetected numeric overflows can result in unexpected application behavior. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p>                                                    | <p>Set <b>Detect overflow</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter IntegerOverflowMsg to error.</p>                  |
| <p>The diagnostic that detects when the value of a block output signal is Inf or NaN at the current time step is set to none or warning. When this type of block output signal condition occurs, numeric exceptions can result, and numeric exceptions are not acceptable in safety-related applications. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p> | <p>Set <b>Inf or NaN block output</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter SignalInfNanChecking to error.</p>        |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Recommended Action                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic that detects Simulink object names that begin with <code>rt</code> is set to <code>none</code> or <code>warning</code>. This diagnostic prevents name clashes with generated signal names that have an <code>rt</code> prefix. (See DO-331, Section MB.6.3.1.e – High-level requirements conform to standards, and DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards.)</p>                                               | <p>Set <b>"rt" prefix for identifiers</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>RTPrefix</code> to <code>error</code>.</p>          |
| <p>The diagnostic that detects simulation range checking is set to <code>none</code> or <code>warning</code>. This diagnostic detects when signals exceed their specified ranges during simulation. Simulink compares the signal values that a block outputs with the specified range and the block data type. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p> | <p>Set <b>Simulation range checking</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>SignalRangeChecking</code> to <code>error</code>.</p> |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to signal data and that can impact safety.

### See Also

- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation
- “Manage Errors and Warnings” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for parameters

Check model configuration for diagnostic settings that apply to parameters and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to parameters are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                             | Recommended Action                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic that detects when a parameter downcast occurs is set to none or warning. A downcast to a lower signal range can result in numeric overflows of parameters, resulting in unexpected behavior. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p>                                                                     | <p>Set <b>Detect downcast</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>ParameterDowncastMsg</code> to error.</p>   |
| <p>The diagnostic that detects when a parameter underflow occurs is set to none or warning. When the data type of a parameter does not have enough resolution, the parameter value is zero instead of the specified value. This can lead to incorrect operation of generated code. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p> | <p>Set <b>Detect underflow</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>ParameterUnderflowMsg</code> to error.</p> |

| <b>Condition</b>                                                                                                                                                                                                                                                                                                                                                                | <b>Recommended Action</b>                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic that detects when a parameter overflow occurs is set to none or warning. Numeric overflows can result in unexpected application behavior and should be detected and fixed in safety-related applications. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p>  | <p>Set <b>Detect overflow</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>ParameterOverflowMsg</code> to error.</p>                 |
| <p>The diagnostic that detects when a parameter loses precision is set to none or warning. Not detecting such errors can result in a parameter being set to an incorrect value in the generated code. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rules 10.1, 10.2, 10.3, and 10.4.)</p> | <p>Set <b>Detect precision loss</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>ParameterPrecisionLossMsg</code> to error.</p>      |
| <p>The diagnostic that detects when an expression with tunable variables is reduced to its numerical equivalent is set to none or warning. This can result in a tunable parameter unexpectedly not being tunable in generated code. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)</p>                    | <p>Set <b>Detect loss of tunability</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>ParameterTunabilityLossMsg</code> to error.</p> |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to parameters and that can impact safety.

**See Also**

- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation
- “Manage Errors and Warnings” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C, Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for data used for debugging

Check model configuration for diagnostic settings that apply to data used for debugging and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to debugging are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                         | Recommended Action                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The diagnostic that enables model verification blocks is set to Use local settings or Enable all. Such blocks should be disabled because they are assertion blocks, which are for verification only. Model developers should not use assertions in embedded code. | Set <b>Model Verification block enabling</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter AssertControl to Disable All. |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to data used for debugging and that can impact safety.

### See Also

- DO-331, Section MB.6.3.1.e – High-level requirements conform to standards
- DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards
- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation

- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for data store memory

Check model configuration for diagnostic settings that apply to data store memory and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to data store memory are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                          | Recommended Action                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The diagnostic that detects whether the model attempts to read data from a data store in which it has not stored data in the current time step is set to a value other than <code>Enable all as errors</code> . Reading data before it is written can result in use of stale data or data that is not initialized. | Set <b>Detect read before write</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>ReadBeforeWriteMsg</code> to <code>Enable all as errors</code> . |
| The diagnostic that detects whether the model attempts to store data in a data store, after previously reading data from it in the current time step, is set to a value other than <code>Enable all as errors</code> . Writing data after it is read can result in use of stale or incorrect data.                 | Set <b>Detect write after read</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>WriteAfterReadMsg</code> to <code>Enable all as errors</code> .   |



| Condition                                                                                                                                                                                                                                                                               | Recommended Action                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The diagnostic that detects whether the model attempts to store data in a data store twice in succession in the current time step is set to a value other than <code>Enable all as errors</code> . Writing data twice in one time step can result in unpredictable data.                | Set <b>Detect write after write</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>WriteAfterWriteMsg</code> to <code>Enable all as errors</code> . |
| The diagnostic that detects when one task reads data from a Data Store Memory block to which another task writes data is set to <code>none</code> or <code>warning</code> . Reading or writing data in different tasks in multitask mode can result in corrupted or unpredictable data. | Set <b>Multitask data store</b> on the <b>Diagnostics &gt; Data Validity</b> pane of the Configuration Parameters dialog box or set the parameter <code>MultiTaskDSMsg</code> to <code>error</code> .                        |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to data store memory and that can impact safety.

### See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for type conversions

Check model configuration for diagnostic settings that apply to type conversions and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to type conversions are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Recommended Action                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic that detects Data Type Conversion blocks used where there is not type conversion is set to none. The Simulink software might remove unnecessary Data Type Conversion blocks from generated code. This might result in requirements without corresponding code. The removal of such blocks need to be detected so model developers can remove the unnecessary blocks explicitly. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)</p> | <p>Set <b>Unnecessary type conversions</b> on the <b>Diagnostics &gt; Type Conversion</b> pane of the Configuration Parameters dialog box or set the parameter <code>UnnecessaryDatatypeConvMsg</code> to warning.</p>      |
| <p>The diagnostic that detects vector-to-matrix or matrix-to-vector conversions at block inputs is set to none or warning. When the Simulink software automatically converts between vector and matrix dimensions, unintended operations or unpredictable behavior can occur. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and</p>                                                                                                                                                                            | <p>Set <b>Vector/matrix block input conversion</b> on the <b>Diagnostics &gt; Type Conversion</b> pane of the Configuration Parameters dialog box or set the parameter <code>VectorMatrixConversionMsg</code> to error.</p> |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                   | Recommended Action                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DO-331, Section MB.6.3.2.g – Algorithms are accurate.)                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                    |
| The diagnostic that detects when a 32-bit integer value is converted to a floating-point value is set to none. This type of conversion can result in a loss of precision due to truncation of the least significant bits for large integer values. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rules 10.1, 10.2, 10.3, and 10.4.) | Set <b>32-bit integer to single precision float conversion</b> on the <b>Diagnostics &gt; Type Conversion</b> pane of the Configuration Parameters dialog box or set the parameter Int32ToFloatConvMsg to warning. |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to type conversions and that can impact safety.

### See Also

- “Diagnostics Pane: Type Conversion” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for signal connectivity

Check model configuration for diagnostic settings that apply to signal connectivity and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to signal connectivity are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                              | Recommended Action                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic that detects virtual signals that have a common source signal but different labels is set to none or warning. This diagnostic pertains to virtual signals only and has no effect on generated code. However, signal label mismatches can lead to confusion during model reviews.</p> | <p>Set <b>Signal label mismatch</b> on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box or set the parameter <code>SignalLabelMismatchMsg</code> to error.</p>      |
| <p>The diagnostic that detects when the model contains a block with an unconnected input signal is set to none or warning. This must be detected because code is not generated for unconnected block inputs.</p>                                                                                       | <p>Set <b>Unconnected block input ports</b> on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box or set the parameter <code>UnconnectedInputMsg</code> to error.</p> |

| Condition                                                                                                                                                                                                          | Recommended Action                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The diagnostic that detects when the model contains a block with an unconnected output signal is set to none or warning. This must be detected because dead code can result from unconnected block output signals. | Set <b>Unconnected block output ports</b> on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box or set the parameter UnconnectedOutputMsg to error. |
| The diagnostic that detects unconnected signal lines and unmatched Goto or From blocks is set to none or warning. This error must be detected because code is not generated for unconnected lines.                 | Set <b>Unconnected line</b> on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box or set the parameter UnconnectedLineMsg to error.                 |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to signal connectivity and that can impact safety.

### See Also

- DO-331, Section MB.6.3.1.e – High-level requirements conform to standards
- DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards
- “Diagnostics Pane: Connectivity” in the Simulink graphical user interface documentation
- “Signal Basics” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for bus connectivity

Check model configuration for diagnostic settings that apply to bus connectivity and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to bus connectivity are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                | Recommended Action                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic that detects whether a Model block's root Output block is connected to a bus but does not specify a bus object is set to none or warning. For a bus signal to cross a model boundary, the signal must be defined as a bus object for compatibility with higher level models that use a model as a reference model.</p> | <p>Set <b>Unspecified bus object at root Output block</b> on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box or set the parameter <code>RootOutputRequireBusObject</code> to error.</p>                                                        |
| <p>The diagnostic that detects whether the name of a bus element matches the name specified by the corresponding bus object is set to none or warning. This diagnostic prevents the use of incompatible buses in a bus-capable block such that the output names are inconsistent.</p>                                                    | <p>Set <b>Element name mismatch</b> on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box or set the parameter <code>BusObjectLabelMismatch</code> to error.</p>                                                                                  |
| <p>The diagnostic that detects when some blocks treat a signal as a mux/vector, while other blocks treat the signal as a bus, is set to none or warning. When the Simulink software automatically converts a muxed signal to a bus, it is possible for</p>                                                                               | <ul style="list-style-type: none"> <li>• Set <b>Mux blocks used to create bus signals</b> on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box to error, or set the parameter <code>StrictBusMsg to ErrorOnBusTreatedAsVector</code>.</li> </ul> |

| Condition                                                          | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>an unintended operation or unpredictable behavior to occur.</p> | <ul style="list-style-type: none"> <li>• Set “Bus signal treated as vector” on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box to error, or the parameter <code>StrictBusMsg</code> to <code>ErrorOnBusTreatedAsVector</code>.</li> </ul> <p>You can use the Model Advisor or the <code>sreplace_mux</code> utility function to replace all Mux block used as bus creators with a Bus Creator block.</p> |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to bus connectivity and that can impact safety.

### See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “Diagnostics Pane: Connectivity” in the Simulink graphical user interface documentation
- `Simulink.Bus` in the Simulink reference documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings that apply to function-call connectivity

Check model configuration for diagnostic settings that apply to function-call connectivity and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to function-call connectivity are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                | Recommended Action                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The diagnostic that detects incorrect use of a function-call subsystem is set to none or warning. If this condition is undetected, incorrect code might be generated.                                                                                                                                                                                                                    | Set <b>Invalid function-call connection</b> on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box or set the parameter <code>InvalidFcnCallConMsg</code> to error.                  |
| The diagnostic that specifies whether the Simulink software has to compute inputs of a function-call subsystem directly or indirectly while executing the subsystem is set to <code>Use local settings</code> or <code>Disable all</code> . This diagnostic detects unpredictable data coupling between a function-call subsystem and the inputs of the subsystem in the generated code. | Set <b>Context-dependent inputs</b> on the <b>Diagnostics &gt; Connectivity</b> pane of the Configuration Parameters dialog box or set the parameter <code>FcnCallInpInsideContextMsg</code> to <code>Enable all</code> . |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to function-call connectivity and that can impact safety.



**See Also**

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “Diagnostics Pane: Connectivity” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for compatibility

Check model configuration for diagnostic settings that affect compatibility and that might impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to compatibility are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                           | Recommended Action                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic that detects when a block has not been upgraded to use features of the current release is set to none or warning. An S-function written for an earlier version might not be compatible with the current version and generated code could operate incorrectly.</p> | <p>Set <b>S-function upgrades needed</b> on the <b>Diagnostics &gt; Compatibility</b> pane of the Configuration Parameters dialog box or set the parameter <code>SFcnCompatibilityMsg</code> to error.</p> |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that affect compatibility and that might impact safety.

### See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- MISRA-C:2004, Rule 9.1
- “Manage Errors and Warnings” in the Simulink documentation
- “Diagnostics Pane: Compatibility” in the Simulink graphical user interface documentation

- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for model initialization

In the model configuration, check diagnostic settings that affect model initialization and might impact safety.

### Description

This check verifies that model diagnostic configuration parameters for initialization are optimally set to generate code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>In the Configuration Parameters dialog box, on the <b>Diagnostics &gt; Data Validity</b> pane, the “<b>Underspecified initialization detection</b>” diagnostic is set to <b>Classic</b>, ensuring compatibility with previous releases of Simulink. The “<b>Check undefined subsystem initial output</b>” diagnostic is cleared. This diagnostic specifies whether Simulink displays a warning if the model contains a conditionally executed subsystem, in which a block with a specified initial condition drives an Outport block with an undefined initial condition. A conditionally executed subsystem could have an output that is not initialized. If undetected, this condition can produce behavior that is nondeterministic.</p> | <p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• In the Configuration Parameters dialog box, on the <b>Diagnostics &gt; Data Validity</b> pane, set “<b>Underspecified initialization detection</b>” to <b>Simplified</b>.</li> <li>• In the Configuration Parameters dialog box, on the <b>Diagnostics &gt; Data Validity</b> pane, set “<b>Underspecified initialization detection</b>” to <b>Classic</b> and select “<b>Check undefined subsystem initial output</b>”.</li> <li>• Set the parameter <code>CheckSSInitialOutputMsg</code> to on.</li> </ul> |
| <p>In the Configuration Parameters dialog box, on the <b>Diagnostics &gt; Data Validity</b> pane, the “<b>Underspecified initialization detection</b>” diagnostic is set to <b>Classic</b>, ensuring compatibility with previous releases of Simulink. The “<b>Check preactivation</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• In the Configuration Parameters dialog box, on the <b>Diagnostics &gt; Data Validity</b> pane, set “<b>Underspecified initialization detection</b>” to <b>Simplified</b>.</li> </ul>                                                                                                                                                                                                                                                                                                                         |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>output of execution context</b>” diagnostic is cleared. This diagnostic detects potential initial output differences from earlier releases. A conditionally executed subsystem could have an output that is not initialized. If undetected, this condition can produce behavior that is nondeterministic.</p>                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• In the Configuration Parameters dialog box, on the <b>Diagnostics &gt; Data Validity</b> pane, set <b>“Underspecified initialization detection”</b> to <b>Classic</b> and select <b>“Check preactivation output of execution context”</b>.</li> <li>• Set the parameter <code>CheckExecutionContextPreStartOutputMsg</code> to on.</li> </ul>                                                                                                                                                                                                               |
| <p>In the Configuration Parameters dialog box, on the <b>Diagnostics &gt; Data Validity</b> pane, the <b>“Underspecified initialization detection”</b> diagnostic is set to <b>Classic</b>, ensuring compatibility with previous releases of Simulink. The <b>“Check runtime output of execution context”</b> diagnostic is cleared. This diagnostic detects potential output differences from earlier releases. A conditionally executed subsystem could have an output that is not initialized and feeds into a block with a tunable parameter. If undetected, this condition can cause the behavior of the downstream block to be nondeterministic.</p> | <p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• In the Configuration Parameters dialog box, on the <b>Diagnostics &gt; Data Validity</b> pane, set <b>“Underspecified initialization detection”</b> to <b>Simplified</b>.</li> <li>• In the Configuration Parameters dialog box, on the <b>Diagnostics &gt; Data Validity</b> pane, set <b>“Underspecified initialization detection”</b> to <b>Classic</b> and select <b>“Check runtime output of execution context”</b>.</li> <li>• Set the parameter <code>CheckExecutionContextRuntimeOutputMsg</code> to on.</li> </ul> |

### Action Results

To configure the diagnostic settings that affect model initialization and might impact safety, click **Modify Settings**.

Subchecks depend on the results of the subchecks noted with **D** in the results table in the Model Advisor window.

### See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent

- MISRA-C:2004, Rule 9.1
- “Manage Errors and Warnings” in the Simulink documentation
- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for model referencing

Check model configuration for diagnostic settings that apply to model referencing and that can impact safety.

### Description

This check verifies that model diagnostic configuration parameters pertaining to model referencing are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Recommended Action                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The diagnostic that detects a mismatch between the version of the model that creates or refreshes a Model block and the current version of the referenced model is set to error or warning. The detection occurs during load and update operations. When you get the latest version of the referenced model from the software configuration management system, rather than an older version that was used in a previous simulation, if this diagnostic is set to error, the simulation is aborted. If the diagnostic is set to warning, a warning message is issued. To resolve the issue, the user must resave the model being simulated, which may not be the desired action. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set <b>Model block version mismatch</b> on the <b>Diagnostics &gt; Model Referencing</b> pane of the Configuration Parameters dialog box or set the parameter <code>ModelReferenceVersionMismatchMessage</code> to none.</p> |
| <p>The diagnostic that detects port and parameter mismatches during model loading and updating is set to none or warning. If undetected, such mismatches can lead to</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Set <b>Port and parameter mismatch</b> on the <b>Diagnostics &gt; Model Referencing</b> pane of the Configuration Parameters dialog box or set the</p>                                                                       |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Recommended Action                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>incorrect simulation results because the parent and referenced models have different interfaces. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>parameter ModelReferenceIOMismatchMessage to error.</p>                                                                                                                                                             |
| <p>The <b>Model configuration mismatch</b> diagnostic is set to none or error. This diagnostic checks whether the configuration parameters of a model referenced by the current model match the current model’s configuration parameters or are inappropriate for a referenced model. Some diagnostics for referenced models are not supported in simulation mode. Setting this diagnostic to error can prevent simulations from running. Some differences in configurations can lead to incorrect simulation results and mismatches between simulation and target code generation. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set <b>Model configuration mismatch</b> on the <b>Diagnostics &gt; Model Referencing</b> pane of the Configuration Parameters dialog box or set the parameter ModelReferenceCSMismatchMessage to warning.</p>       |
| <p>The diagnostic that detects invalid internal connections to the current model’s root-level Inport and Outport blocks is set to none or warning. When this condition is detected, the Simulink software might automatically insert hidden blocks into the model to fix the condition. The hidden blocks can result in generated code without traceable requirements. Setting the diagnostic to error forces model developers to fix the referenced models manually. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p>                                                                                                               | <p>Set <b>Invalid root Inport/Outport block connection</b> on the <b>Diagnostics &gt; Model Referencing</b> pane of the Configuration Parameters dialog box or set the parameter ModelReferenceIOMessage to error.</p> |
| <p>The diagnostic that detects whether To Workspace or Scope blocks are logging data in a referenced model is set to none or</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>Set <b>Unsupported data logging</b> on the <b>Diagnostics &gt; Model Referencing</b> pane of the Configuration Parameters dialog box or set the</p>                                                                 |



| Condition                                                                                                                                                                                                                                        | Recommended Action                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| warning. Data logging is not supported for To Workspace and Scope blocks in referenced models. (See DO-331, Section MB.6.3.1.d – High-level requirements are verifiable and DO-331, Section MB.6.3.2.d – Low-level requirements are verifiable.) | parameter ModelReferenceDataLoggingMessage to error.<br>To log data, remove the blocks and log the referenced model signals. For more information, see “Logging Referenced Model Signals”. |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to model referencing and that can impact safety.

### See Also

- “Manage Errors and Warnings” in the Simulink documentation
- “Diagnostics Pane: Model Referencing” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “Logging Referenced Model Signals” in the Simulink documentation

## Check safety-related model referencing settings

Check model configuration for model referencing settings that can impact safety.

### Description

This check verifies that model configuration parameters for model referencing are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Recommended Action                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The referenced model is configured such that its target is rebuilt whenever you update, simulate, or generate code for the model, or if the Simulink software detects changes in known dependencies. These configuration settings can result in unnecessary regeneration of the code, resulting in changing only the date of the file and slowing down the build process when using model references. (See DO-331, Section MB.6.3.1.b – High-level requirements are accurate and consistent and DO-331, Section MB.6.3.2.b – Low-level requirements are accurate and consistent.)</p> | <p>Set “Rebuild” on the <b>Model Referencing</b> pane of the Configuration Parameters dialog box or set the parameter <code>UpdateModelReferenceTargets</code> to Never or If any changes detected.</p> |
| <p>The diagnostic that detects whether a target needs to be rebuilt is set to None or Warn if targets require rebuild. For safety-related applications, an error should alert model developers that the parent and referenced models are inconsistent. This diagnostic parameter is available only if <b>Rebuild</b> is set to Never. (See DO-331, Section MB.6.3.1.b – High-level requirements are accurate and consistent</p>                                                                                                                                                          | <p>Set “Never rebuild diagnostic” on the <b>Model Referencing</b> pane of the Configuration Parameters dialog box or set the parameter <code>CheckModelReferenceTargetMessage</code> to error.</p>      |

| Condition                                                                                                                                                                                                                                                                  | Recommended Action                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| and DO-331, Section MB.6.3.2.b – Low-level requirements are accurate and consistent.)                                                                                                                                                                                      |                                                                                                                                                                                                                                         |
| The ability to pass scalar root input by value is on. This capability should be off because scalar values can change during a time step and result in unpredictable data. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)                          | Set “Pass fixed-size scalar root inputs by value for code generation” on the <b>Model Referencing</b> pane of the Configuration Parameters dialog box or set the parameter <code>ModelReferencePassRootInputsByReference</code> to off. |
| The model is configured to minimize algebraic loop occurrences. This configuration is incompatible with the recommended setting of <b>Single output/update function</b> for embedded systems code. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.) | Set “Minimize algebraic loop occurrences” on the <b>Model Referencing</b> pane of the Configuration Parameters dialog box or set the parameter <code>ModelReferenceMinAlgLoopOccurrences</code> to off.                                 |

### Action Results

Clicking **Modify Settings** configures model referencing settings that can impact safety.

Subchecks depend on the results of the subchecks noted with **D** in the results table in the Model Advisor window.

### See Also

- “Analyze Model Dependencies” in the Simulink documentation
- “Model Referencing Pane” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related code generation settings

Check model configuration for code generation settings that can impact safety.

### Description

This check verifies that model configuration parameters for code generation are set optimally for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                      | Recommended Action                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The option to include comments in the generated code is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)                                     | Select <b>Include comments</b> on the <b>Code Generation &gt; Comments</b> pane of the Configuration Parameters dialog box or set the parameter <code>GenerateComments</code> to on.                                |
| The option to include comments that describe the code for blocks is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)                         | Select <b>Simulink block / Stateflow object comments</b> on the <b>Code Generation &gt; Comments</b> pane of the Configuration Parameters dialog box or set the parameter <code>SimulinkBlockComments</code> to on. |
| The option to include comments that describe the code for blocks eliminated from a model is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.) | Select <b>Show eliminated blocks</b> on the <b>Code Generation &gt; Comments</b> pane of the Configuration Parameters dialog box or set the parameter <code>ShowEliminatedStatement</code> to on.                   |

| Condition                                                                                                                                                                                                                                                                                                                                                                           | Recommended Action                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The option to include the names of parameter variables and source blocks as comments in the model parameter structure declaration in <i>model_prm.h</i> is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)</p>                                                | <p>Select <b>Verbose comments for SimulinkGlobal storage class</b> on the <b>Code Generation &gt; Comments</b> pane of the Configuration Parameters dialog box or set the parameter ForceParamTrailComments to on.</p> |
| <p>The option to include requirement descriptions assigned to Simulink blocks as comments is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)</p>                                                                                                                 | <p>Select <b>Requirements in block comments</b> on the <b>Code Generation &gt; Comments</b> pane of the Configuration Parameters dialog box or set the parameter ReqsInCode to on.</p>                                 |
| <p>The option to generate nonfinite data and operations is selected. Support for nonfinite numbers is inappropriate for real-time embedded systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p>                                 | <p>Clear <b>Support: non-finite numbers</b> on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box or set the parameter SupportNonFinite to off.</p>                             |
| <p>The option to generate and maintain integer counters for absolute and elapsed time is selected. Support for absolute time is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Clear <b>Support: absolute time</b> on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box or set the parameter SupportAbsoluteTime to off.</p>                               |

| <b>Condition</b>                                                                                                                                                                                                                                                                                                                                                                                    | <b>Recommended Action</b>                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The option to generate code for blocks that use continuous time is selected. Support for continuous time is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p>                                  | <p>Clear <b>Support: continuous time</b> on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box or set the parameter <code>SupportContinuousTime</code> to off.</p>          |
| <p>The option to generate code for noninlined S-functions is selected. This option requires support of nonfinite numbers, which is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p>              | <p>Clear <b>Support: non-inlined S-functions</b> on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box or set the parameter <code>SupportNonInlinedSFcns</code> to off.</p> |
| <p>The option to generate model function calls compatible with the main program module of the pre-R2012a GRT target is selected. This option is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Clear <b>Classic call interface</b> on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box or set the parameter <code>GRTInterface</code> to off.</p>                     |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                           | Recommended Action                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The option to generate the <i>model_update</i> function is cleared. Having a single call to the output and update functions simplifies the interface to the real-time operating system (RTOS) and simplifies verification of the generated code. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Select <b>Single output/update function</b> on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box or set the parameter <code>CombineOutputUpdateFcns</code> to on.</p>                       |
| <p>The option to generate the <i>model_terminate</i> function is selected. This function deallocates dynamic memory, which is unsuitable for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p>                                                                      | <p>Clear <b>Terminate function required</b> on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box or set the parameter <code>IncludeMdlTerminateFcn</code> to off.</p>                          |
| <p>The option to log or monitor error status is cleared. If you do not select this option, the Simulink Coder product generates extra code that might not be reachable for testing. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p>                                                                 | <p>Select <b>Suppress error status in real-time model data structure</b> on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box or set the parameter <code>SuppressErrorStatus</code> to on.</p> |

| <b>Condition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Recommended Action</b>                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>MAT-file logging is selected. This option adds extra code for logging test points to a MAT-file, which is not supported by embedded targets. Use this option only in test harnesses. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p>                                                                                  | <p>Clear <b>MAT-file logging</b> on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box or set the parameter <code>MatFileLogging</code> to off.</p>                                       |
| <p>The option that specifies the style for parenthesis usage is set to Minimum (Rely on C/C++ operators precedence) or to Nominal (Optimize for readability). For safety-related applications, explicitly specify precedence with parentheses. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer, DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer, and MISRA-C:2004, Rule 12.1.)</p> | <p>Set <b>Parenthesis level</b> on the <b>Code Generation &gt; Code</b> pane of the Configuration Parameters dialog box or set the parameter <code>ParenthesesLevel</code> to Maximum (Specify precedence with parentheses).</p> |
| <p>The option that specifies whether to preserve operand order is cleared. This option increases the traceability of the generated code. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)</p>                                                                                                                                                                                                                                      | <p>Select <b>Preserve operand order in expression</b> on the <b>Code Generation &gt; Code</b> pane of the Configuration Parameters dialog box or set the parameter <code>PreserveExpressionOrder</code> to on.</p>               |
| <p>The option that specifies whether to preserve empty primary condition expressions in <code>if</code> statements is cleared. This option increases the traceability of the generated code. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)</p>                                                                                                                                                                                  | <p>Select <b>Preserve condition expression in if statement</b> on the <b>Code Generation &gt; Code</b> pane of the Configuration Parameters dialog box or set the parameter <code>PreserveIfCondition</code> to on.</p>          |



| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Recommended Action                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The option that specifies whether to generate preprocessor conditional directives is set to generate code for nonactive variants. This might result in generating code that does not trace to the active variant of a variant model block or a variant subsystem. (See DO-331 Section MB.6.3.4.e — Source code is traceable to low-level requirements.)</p>                                                                                                                   | <p>Set “<b>Generate preprocessor conditionals</b>” on the <b>Code Generation &gt; Interface</b> pane of the Configuration Parameters dialog box to <b>Disable All</b>.</p>                          |
| <p>The minimum number of characters specified for generating name mangling strings is less than four. You can use this option to minimize the likelihood that parameter and signal names will change during code generation when the model changes. Use of this option assists with minimizing code differences between file versions, decreasing the effort to perform code reviews. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)</p> | <p>Set <b>Minimum mangle length</b> on the <b>Code Generation &gt; Symbols</b> pane of the Configuration Parameters dialog box or the parameter <b>MangleLength</b> to a value of 4 or greater.</p> |

### Action Results

Clicking **Modify Settings** configures model code generation settings that can impact safety.

Subchecks depend on the results of the subchecks noted with **D** in the results table in the Model Advisor window.

### See Also

- “Code Generation Pane: Comments” “Code Generation Pane: Comments” in the Simulink Coder reference documentation
- “Code Generation Pane: Symbols” in the Simulink Coder reference documentation

- “Code Generation Pane: Interface” in the Simulink Coder reference documentation
- “Code Generation Pane: Code Style” in the Embedded Coder reference documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## Check safety-related diagnostic settings for saving

Check model configuration for diagnostic settings that apply to saving model files

### Description

This check verifies that model configuration parameters are set optimally for saving a model for a safety-related application.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                           | Recommended Action                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The diagnostic that detects whether a model contains disabled library links before the model is saved is set to none or warning. If this condition is undetected, incorrect code might be generated.                                | Set <b>Block diagram contains disabled library links</b> on the <b>Diagnostics &gt; Saving</b> > pane of the Configuration Parameters dialog box or set the parameter <code>SaveWithDisabledLinkMsg</code> to error.           |
| The diagnostic that detects whether a model contains library links that are using parameters not in a mask before the model is saved is set to none or warning. If this condition is undetected, incorrect code might be generated. | Set <b>Block diagram contains parameterized library links</b> on the <b>Diagnostics &gt; Saving</b> > pane of the Configuration Parameters dialog box or set the parameter <code>SaveWithParameterizedLinkMsg</code> to error. |

### Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to saving a model file.

### See Also

- DO-331, Section MB.6.3.3.b - Software architecture is consistent
- “Disable Links to Library Blocks” in the Simulink documentation
- “Identify disabled library links” in the Simulink documentation

- “Save a Model” in the Simulink documentation
- “Model Parameters” in the Simulink documentation
- “Diagnostics Pane: Saving” in the Simulink documentation

## Check for blocks that do not link to requirements

Check whether Simulink blocks and Stateflow objects link to a requirements document.

### Description

This check verifies whether Simulink blocks and Stateflow objects link to a document containing engineering requirements for traceability.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                      | Recommended Action                                                                                |
|------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Blocks do not link to a requirements document. | Link to requirements document. See “Link to Requirements Document Using Selection-Based Linking”. |

### Capabilities and Limitations

- You can run this check on your library models.
- When you run this check, the Model Advisor does not follow library links or look under masks.

### Tip

Run this check from the top model or subsystem that you want to check.

### See Also

- DO-331, Section MB.6.3.1.f - High-level requirements trace to system requirements
- DO-331, Section MB.6.3.2.f - Low-level requirements trace to high-level requirements
- “Requirements Traceability”

## Check usage of Math blocks

Check whether math operators require nonfinite number support.

### Description

This check verifies that Math Function blocks do not use math operations that need nonfinite number support with real-time embedded targets.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                  | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Math Function blocks using <code>log</code> (natural logarithm), <code>log10</code> (base 10 logarithm), and <code>rem</code> (Remainder) operators that require nonfinite number support. | <p>When using the Math Function block with a <code>log</code> or <code>log10</code> function, you must protect the input to the block in the model such that it is not less than or equal to zero. Otherwise, the output can produce a NaN or <code>-Inf</code> and result in a run-time error in the generated code.</p> <p>When using the Math Function block with a <code>rem</code> function, you must protect the second input to the block such that it is not equal to zero. Otherwise the output can produce a <code>Inf</code> or <code>-Inf</code> and result in a run-time error in the generated code.</p> |

### Capabilities and Limitations

You can run this check on your library models.

### Tips

With embedded systems, you must take care when using blocks that could produce nonfinite outputs such as NaN, `Inf` or `-Inf`. Your design must protect

the inputs to these blocks in order to avoid run-time errors in the embedded system.

**See Also**

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- MISRA-C:2004, Rule 21.1
- Math Function block in the Simulink documentation

## Check state machine type of Stateflow charts

Identify whether Stateflow charts are all Mealy or all Moore charts.

### Description

Compares the state machine type of all Stateflow charts to the type that you specify in the input parameters.

Available with Simulink Verification and Validation.

### Input Parameters

#### Common

Check whether charts use the same state machine type, and are all Mealy or all Moore charts.

#### Mealy

Check whether all charts are Mealy charts.

#### Moore

Check whether all charts are Moore charts.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                         | Recommended Action                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The input parameter is set to <b>Common</b> and charts in the model use either of the following:</p> <ul style="list-style-type: none"> <li>• Classic state machine types.</li> <li>• Multiple state machine types.</li> </ul> | <p>For each chart, in the Chart Properties dialog box, specify <b>State Machine Type</b> to either <b>Mealy</b> or <b>Moore</b>. Use the same state machine type for all charts in the model.</p> |
| <p>The input parameter is set to <b>Mealy</b> and charts in the model use other state machine types.</p>                                                                                                                          | <p>For each chart, in the Chart Properties dialog box, specify <b>State Machine Type</b> to <b>Mealy</b>.</p>                                                                                     |
| <p>The input parameter is set to <b>Moore</b> and charts in the model use other state machine types.</p>                                                                                                                          | <p>For each chart, in the Chart Properties dialog box, specify <b>State Machine Type</b> to <b>Moore</b>.</p>                                                                                     |



## Capabilities and Limitations

You can run this check on your library models.

### See Also

- DO-331, Section MB.6.3.1.b - High-level requirements are accurate and consistent
- DO-331, Section MB.6.3.1.e - High-level requirements conform to standards
- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- DO-331, Section MB.6.3.2.e - Low-level requirements conform to standards
- DO-331, Section MB.6.3.3.b - Software architecture is consistent
- DO-331, Section MB.6.3.3.e - Software architecture conform to standards
- “hisf\_0001: Mealy and Moore semantics”
- “Overview of Mealy and Moore Machines”
- “Chart Properties”
- “Chart Architecture”

## Check Stateflow charts for ordering of states and transitions

Identify Stateflow charts that have **User specified state/transition execution order** cleared.

### Description

Identify Stateflow charts that have **User specified state/transition execution order** cleared, and therefore do not use explicit ordering of parallel states and transitions.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                             | Recommended Action                                                                                                            |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Stateflow charts have <b>User specified state/transition execution order</b> cleared. | For the specified charts, in the Chart Properties dialog box, select <b>User specified state/transition execution order</b> . |

### Capabilities and Limitations

You can run this check on your library models.

### Action Results

Clicking **Modify** selects **User specified state/transition execution order** for the specified charts.

### See Also

- DO-331, Section MB.6.3.3.b - Software architecture is consistent
- DO-331, Section MB.6.3.3.e - Software architecture conform to standards
- “hisf\_0002: User-specified state/transition execution order”

“Transition Testing Order in Multilevel State Hierarchy” in the Stateflow documentation.

- “Execution Order for Parallel States” in the Stateflow documentation.
- “Chart Properties”
- “Chart Architecture”

## Check Stateflow debugging options

Identify whether Stateflow debugging options are cleared.

### Description

Identify whether the following debugging options are cleared, which might lead to unreachable code and indeterminate execution time:

- **Enable debugging/animation**
- **Enable overflow detection (with debugging)**
- **Transition Conflict**
- **Data Range**
- **Detect Cycles**

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                        | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Any of the following debugging options are cleared:</p> <ul style="list-style-type: none"> <li>• <b>Enable debugging/animation</b></li> <li>• <b>Enable overflow detection (with debugging)</b></li> <li>• <b>Transition Conflict</b></li> <li>• <b>Data Range</b></li> <li>• <b>Detect Cycles</b></li> </ul> | <p>Select the debugging options. In the Configuration Parameters dialog box, select:</p> <ul style="list-style-type: none"> <li>• <b>Simulation Target &gt; General &gt; Enable debugging/animation</b></li> <li>• <b>Simulation Target &gt; General &gt; Enable overflow detection (with debugging)</b></li> </ul> <p>In the Stateflow Debugging dialog box, select:</p> <ul style="list-style-type: none"> <li>• <b>Transition Conflict</b></li> <li>• <b>Data Range</b></li> <li>• <b>Detect Cycles</b></li> </ul> |

## Action Results

Clicking **Modify** selects the specified debugging options.

## See Also

- DO-331, Section MB.6.3.1.b - High-level requirements are accurate and consistent
- DO-331, Section MB.6.3.1.e - High-level requirements conform to standards
- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- DO-331, Section MB.6.3.2.e - Low-level requirements conform to standards
- “hisf\_0011: Stateflow debugging settings”
- “Chart Properties”
- “Chart Architecture”

## Check usage of lookup table blocks

Check for lookup table blocks that do not generate out-of-range checking code.

### Description

This check verifies that the following blocks generate code to protect against inputs that fall outside the range of valid breakpoint values:

- 1-D Lookup Table
- 2-D Lookup Table
- n-D Lookup Table
- Prelookup

This check also verifies that Interpolation Using Prelookup blocks generate code to protect against inputs that fall outside the range of valid index values.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                            | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The lookup table block does not generate out-of-range checking code. | Change the setting on the block dialog box so that out-of-range checking code is generated. <ul style="list-style-type: none"> <li>• For the 1-D Lookup Table, 2-D Lookup Table, n-D Lookup Table, and Prelookup blocks, clear the check box for <b>Remove protection against out-of-range input in generated code</b>.</li> <li>• For the Interpolation Using Prelookup block, clear the check box for <b>Remove protection against out-of-range index in generated code</b>.</li> </ul> |

**Action Results**

Clicking **Modify** verifies that lookup table blocks are set to generate out-of-range checking code.

**Capabilities and Limitations**

You can run this check on your library models.

**See Also**

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- n-D Lookup Table block in the Simulink documentation
- Prelookup block in the Simulink documentation
- Interpolation Using Prelookup block in the Simulink documentation

## Check MATLAB Code Analyzer messages

Check MATLAB Functions for  `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs.

### Description

Verifies  `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs for:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                   | Recommended Action                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>For MATLAB code in MATLAB Function blocks, either of the following:</p> <ul style="list-style-type: none"> <li>• Code lines are not justified with a <code> %#ok</code> comment.</li> <li>• Codes lines justified with <code> %#ok</code> do not specify a message id.</li> </ul>        | <ul style="list-style-type: none"> <li>• Implement MATLAB Code Analyzer recommendations.</li> <li>• Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment.</li> <li>• Specify justified code lines with a message id. For example, <code> %#ok&lt;NOPRT&gt;</code>.</li> </ul> |
| <p>For MATLAB functions defined in Stateflow charts, either of the following:</p> <ul style="list-style-type: none"> <li>• Code lines are not justified with a <code> %#ok</code> comment.</li> <li>• Codes lines justified with <code> %#ok</code> do not specify a message id.</li> </ul> | <ul style="list-style-type: none"> <li>• Implement MATLAB Code Analyzer recommendations.</li> <li>• Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment.</li> <li>• Specify justified code lines with a message id. For example, <code> %#ok&lt;NOPRT&gt;</code>.</li> </ul> |
| <p>For called MATLAB functions:</p>                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Insert <code> %#codegen</code> directive in the MATLAB code.</li> </ul>                                                                                                                                                                                                      |



| Condition                                                                                                                                                                                                                                                                   | Recommended Action                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Code does not have the <code>%%codegen</code> directive.</li> <li>• Code lines are not justified with a <code>%%ok</code> comment.</li> <li>• Codes lines justified with <code>%%ok</code> do not specify a message id.</li> </ul> | <ul style="list-style-type: none"> <li>• Implement MATLAB Code Analyzer recommendations.</li> <li>• Justify not following MATLAB Code Analyzer recommendations with a <code>%%ok</code> comment.</li> <li>• Specify justified code lines with a message id. For example, <code>%%ok&lt;NOPRT&gt;</code>.</li> </ul> |

### See Also

- DO-331, Sections MB.6.3.1.b and MB.6.3.2.b - Accuracy and consistency
- “Check Code for Errors and Warnings”
- “himl\_0004: MATLAB Code Analyzer recommendations for code generation”

## Check MATLAB code for global variables

Check for global variables in MATLAB code.

### Description

Verifies that global variables are not used in any of the following:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                   | Recommended Action                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Global variables are used in one or more of the following: <ul style="list-style-type: none"><li>• MATLAB code in MATLAB Function blocks</li><li>• MATLAB functions defined in Stateflow charts</li><li>• Called MATLAB functions</li></ul> | Replace global variables with signal lines, function arguments, or persistent data. |

### See Also

- DO-331, Sections MB.6.3.3.b ‘Consistency’
- “himl\_0005: Usage of global variables in MATLAB functions”

## Check for inconsistent vector indexing methods

Identify blocks with inconsistent indexing method.

### Description

Using inconsistent block indexing methods can result in modeling errors. You should use a consistent vector indexing method for all blocks. This check identifies blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                    | Recommended Action                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| The model or subsystem contains blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified. | Modify the model to use a single consistent indexing method. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “hisl\_0021: Consistent vector indexing method”

## Check for MATLAB Function block interfaces with inherited properties

Identify MATLAB Function blocks that have inputs, outputs or parameters with inherited complexity or data type properties.

### Description

The check identifies MATLAB Function blocks with inherited complexity or data type properties. A results table provides links to MATLAB Function blocks that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                         | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MATLAB Function blocks have inherited interfaces. | <p>Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Function block identified in the results.</p> <p>If applicable, using the “MATLAB Function Block Editor”, make the following modifications in the “Ports and Data Manager”:</p> <ul style="list-style-type: none"> <li>• Change <b>Complexity</b> from Inherited to On or Off.</li> <li>• Change <b>Type</b> from Inherit: Same as Simulink to an explicit type.</li> </ul> <p>In the results table, <b>Compiled Value</b> provides suggestions for the actual values after the model compiles. If a MATLAB Function</p> |

| Condition | Recommended Action                                                                                                                                                                                                                                                                                                |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | block is defined within a library, explicitly define the interface in the library rather than in the referencing model. If your model has multiple instances of MATLAB Function blocks defined in a library block, and the instances have different interface properties, consider using multiple library blocks. |

### See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “himl\_0002: Strong data typing at MATLAB function boundaries”

## Check MATLAB Function block metrics

Display complexity and code metrics for MATLAB Function blocks and external MATLAB functions. Report metric violations.

### Description

This check provides complexity and code metrics for MATLAB Function blocks and external MATLAB functions. The check additionally reports metric violations.

A results table provides links to MATLAB Function blocks and external MATLAB functions that violate the complexity input parameters.

Available with Simulink Verification and Validation.

### Input Parameters

#### Maximum effective lines of code per function

Provide the maximum effective lines of code per function. Effective lines do not include empty lines, comment lines, or lines with a function end keyword.

#### Minimum density of comments

Provide minimum density of comments. Density is ratio of comment lines to total lines of code.

#### Maximum cyclomatic complexity per function

Provide maximum cyclomatic complexity per function. Cyclomatic complexity is the number of linearly independent paths through the source code.

## Results and Recommended Actions

| Condition                                                                                    | Recommended Action                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MATLAB Function blocks or external MATLAB functions violate the complexity input parameters. | <p>For the MATLAB Function block or external MATLAB function:</p> <ul style="list-style-type: none"> <li>• If effective lines of code is too high, further divide the MATLAB function.</li> <li>• If comment density is too low, add comment lines.</li> <li>• If cyclomatic complexity per function is too high, further divide the MATLAB function.</li> </ul> |

### See Also

- DO-331, Sections MB.6.3.1.e - High-level requirements conform to standards
- DO-331, Sections MB.6.3.2.e - Low-level requirements conform to standards
- “himl\_0003: Limitation of MATLAB function complexity”

## Check for blocks not recommended for C/C++ production code deployment

Identify blocks not supported by code generation or not recommended for C/C++ production code deployment.

### Description

This check partially identifies model constructs that are not recommended for C/C++ production code generation as identified in the Simulink Block Support tables for Simulink Coder and Embedded Coder. If you are using blocks with support notes for code generation, review the information and follow the given advice.

Available with Simulink Verification and Validation and Embedded Coder.

### Results and Recommended Actions

| Condition                                                                                      | Recommended Action                                                                                                             |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| The model or subsystem contains blocks that should not be used for production code deployment. | Consider replacing the blocks listed in the results. Click an element from the list of questionable items to locate condition. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- MISRA-C: 2004, Rule 5.6
- “Supported Products and Block Usage”



## Check Stateflow charts for uniquely defined data objects

Identify Stateflow charts that include data objects that are not uniquely defined.

### Description

This check searches your model for local data in Stateflow charts that is not uniquely defined.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                            | Recommended Action                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The Stateflow chart contains a data object identifier defined in two or more scopes. | For the identified chart, do one of the following: <ul style="list-style-type: none"> <li>• Create a unique data object identifier within each of the scopes.</li> <li>• Create a unique data object identifier within the chart, at the parent level.</li> </ul> |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- MISRA-C: 2004, Rule 5.6
- “hisl\_0061: Unique identifiers for clarity”

## Check usage of Math Operations blocks

Identify usage of Math Operation blocks that might impact safety.

### Description

This check inspects the usage of the following blocks:

- Abs
- Gain
- Math Function
  - Natural logarithm
  - Common (base 10) logarithm
  - Remainder after division
  - Reciprocal
- Assignment

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The model or subsystem contains an Absolute Value block that is operating on one of the following:</p> <ul style="list-style-type: none"> <li>• A boolean or an unsigned input data type. This condition results in unreachable simulation pathways through the model and might result in unreachable code</li> <li>• A signed integer value with the <b>Saturate on integer overflow</b> check box not selected. For signed data types, the absolute value of the most negative value is</li> </ul> | <p>If the identified Absolute Value block is operating on a boolean or unsigned data type, do one of the following:</p> <ul style="list-style-type: none"> <li>• Change the input of the Absolute Value block to a signed input type.</li> <li>• Remove the Absolute Value block from the model.</li> </ul> <p>If the identified Absolute Value block is operating on a signed data type, in the <b>Block Parameters</b> &gt;</p> |

| Condition                                                                                                                                                                                                                            | Recommended Action                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>problematic because it is not representable by the data type. This condition results in an overflow in the generated code.</p>                                                                                                    | <p><b>Signal Attributes</b> dialog box, select <b>Saturate on integer overflow</b>.</p>                                                                                                                                                                                                         |
| <p>The model or subsystem contains Gain blocks with a of value 1.</p>                                                                                                                                                                | <p>If you are using Gain blocks as buffers, consider replacing them with Signal Conversion blocks.</p>                                                                                                                                                                                          |
| <p>The model or subsystem contains Math Function - Natural logarithm (<math>\log</math>) blocks that might result in non-finite output signals. Non-finite signals are not supported in real-time embedded systems.</p>              | <p>When using the Math Function block with a <math>\log</math> function, protect the input to the block from being less than or equal to zero. Otherwise, the output can produce a NaN or <math>-\text{Inf}</math> and result in a run-time error in the generated code.</p>                    |
| <p>The model or subsystem contains Math Function - Common (base 10)(base 10 logarithm) blocks that might result in non-finite output signals. Non-finite signals are not supported in real-time embedded systems.</p>                | <p>When using the Math Function block with a <math>\log_{10}</math> function, protect the input to the block from being less than or equal to zero. Otherwise, the output can produce a NaN or <math>-\text{Inf}</math> and result in a run-time error in the generated code.</p>               |
| <p>The model or subsystem contains Math Function - Remainder after division (<math>\text{rem}</math>) blocks that might result in non-finite output signals. Non-finite signals are not supported in real-time embedded systems.</p> | <p>When using the Math Function block with a <math>\text{rem}</math> function, protect the second input to the block from being equal to zero. Otherwise the output can produce a <math>\text{Inf}</math> or <math>-\text{Inf}</math> and result in a run-time error in the generated code.</p> |

| <b>Condition</b>                                                                                                                                                                                   | <b>Recommended Action</b>                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The model or subsystem contains Math Function - Reciprocal (reciprocal) blocks that might result in non-finite output signals. Non-finite signals are not supported in real-time embedded systems. | When using the Math Function block with a reciprocal function, protect the input to the block from being equal to zero. Otherwise the output can produce a Inf or - Inf and result in a run-time error in the generated code. |
| The model or subsystem might contain Assignment blocks with incomplete array initialization that do not have block parameter <b>Action if any output element is not assigned</b> set to Error.     | When using the Assignment block with incompleated array initialization, set block parameter <b>Action if any output element is not assigned</b> to Error.                                                                     |

**See Also**

- DO-331 Section MB.6.3.1.d – High-level requirements are verifiable
- DO-331 Section MB.6.3.2.d – Low-level requirements are verifiable
- MISRA-C:2004, Rule 14.1
- MISRA-C:2004, Rule 21.1
- “hisl\_0001: Usage of Abs block”
- “hisl\_0002: Usage of Math Function blocks (rem and reciprocal)”
- “hisl\_0004: Usage of Math Function blocks (natural logarithm and base 10 logarithm)”
- “hisl\_0029: Usage of Assignment blocks”

## Check usage of Signal Routing blocks

Identify usage of Signal Routing blocks that might impact safety.

### Description

This check identifies model or subsystem Switch blocks that might generate code with inequality operations ( $\sim=$ ) in expressions that contain a floating-point variable or constant.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                         | Recommended Action                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The model or subsystem contains a Switch block that might generate code with inequality operations (<math>\sim=</math>) in expressions where at least one side of the expression contains a floating-point variable or constant. The Switch block might cause floating-point inequality comparisons in the generated code.</p> | <p>For the identified block, do one of the following:</p> <ul style="list-style-type: none"> <li>• For the control input block, change the <b>Data type</b> parameter setting.</li> <li>• Change the Switch block <b>Criteria for passing first input</b> parameter setting. This might change the algorithm.</li> </ul> |

### See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- MISRA-C:2004, Rule 13.3

## Check usage of Logic and Bit Operations blocks

Identify usage of Logical Operator and Bit Operations blocks that might impact safety.

### Description

This check inspects the usage of:

- Blocks that compute relational operators, including Relational Operator, Compare To Constant, Compare To Zero, and Detect Change blocks
- Logical Operator blocks

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                            | Recommended Action                                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The model or subsystem contains a block computing a relational operator that is operating on different data types. The condition can lead to unpredictable results in the generated code.                                                                                                                                                            | On the <b>Block Parameters &gt; Signal Attributes</b> pane, set the <b>Output data type</b> to boolean for the specified blocks.                                                                                                 |
| The model or subsystem contains a block computing a relational operator that uses the == or ~= operator to compare floating-point signals. The use of these operators on floating-point signals is unreliable and unpredictable because of floating-point precision issues. These operators can lead to unpredictable results in the generated code. | For the identified block, do one of the following: <ul style="list-style-type: none"> <li>• Change the signal data type.</li> <li>• Rework the model to eliminate using == or ~= operators on floating-point signals.</li> </ul> |
| The model or subsystem contains a Logical Operator block that has inputs or outputs that are not                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Modify the Logical Operator block so that all inputs and outputs are Boolean. On the</li> </ul>                                                                                         |

| Condition                                                                                                                            | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Boolean inputs or outputs. The block might result in floating-point equality or inequality comparisons in the generated code.</p> | <p><b>Block Parameters &gt; Signal Attributes</b> pane, consider selecting <b>Require all inputs to have the same data type</b> and setting <b>Output data type</b> to boolean.</p> <ul style="list-style-type: none"> <li>• In the Configuration Parameters dialog box, on the <b>Optimization</b> pane, consider selecting the <b>Implement logic signals as boolean data (vs. double)</b>.</li> </ul> |

### See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- MISRA-C:2004, Rule 13.3
- “hisl\_0016: Usage of blocks that compute relational operators”
- “hisl\_0017: Usage of blocks that compute relational operators (2)”

## Check usage of Ports and Subsystems blocks

Identify usage of Ports and Subsystems blocks that might impact safety.

### Description

This check inspects the usage of:

- For Iterator blocks
- While Iterator blocks
- If blocks
- Switch Case blocks

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                   | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The model or subsystem contains a For Iterator block that has variable iterations. This condition can lead to unpredictable execution times or infinite loops in the generated code.</p> | <p>For the identified For Iterator blocks, do one of the following:</p> <ul style="list-style-type: none"> <li>• Set the <b>Iteration limit source</b> parameter to <code>internal</code>.</li> <li>• If the <b>Iteration limit source</b> parameter must be <code>external</code>, use a Constant, Probe, or Width block as the source.</li> <li>• Clear the <b>Set next i (iteration variable) externally</b> check box.</li> <li>• Consider selecting the <b>Show iteration variable</b> check box and observe the iteration value during simulation.</li> </ul> |
| <p>The model or subsystem contains a While Iterator block that has unlimited iterations. This condition</p>                                                                                 | <p>For the identified While Iterator blocks:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



| Condition                                                                                                                                                                     | Recommended Action                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| can lead to infinite loops in the generated code.                                                                                                                             | <ul style="list-style-type: none"> <li>• Set the <b>Maximum number of iterations (-1 for unlimited)</b> parameter to a positive integer value.</li> <li>• Consider selecting the <b>Show iteration number port</b> check box and observe the iteration value during simulation.</li> </ul> |
| The model or subsystem contains an If block with an If expression or Elseif expressions that might cause floating-point equality or inequality comparisons in generated code. | Modify the expressions in the If block to avoid floating-point equality or inequality comparisons in generated code.                                                                                                                                                                       |
| The model or subsystem contains an If block using Elseif expressions without an Else condition.                                                                               | In the If block <b>Block Parameters</b> dialog box, select <b>Show else condition</b> . Connect the resulting Else output port to an If Action Subsystem block.                                                                                                                            |
| The model or subsystem contains an If block with output ports that do not connect to If Action Subsystem blocks.                                                              | Verify that output ports of the If block connect to If Action Subsystem blocks.                                                                                                                                                                                                            |
| The model or subsystem contains an Switch Case block without a default case.                                                                                                  | In the Switch Case block <b>Block Parameters</b> dialog box, select <b>Show default case</b> . Connect the resulting default output port to a Switch Case Action Subsystem block.                                                                                                          |
| The model or subsystem contains a Switch Case block with an output port that does not connect to a Switch Case Action Subsystem block.                                        | Verify that output ports of the Switch Case blocks connect to Switch Case Action Subsystem blocks.                                                                                                                                                                                         |

### See Also

- DO-331, Section MB.6.3.3.b—Software architecture is consistent
- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- DO-331, Section MB.6.3.1.e – High-level requirements conform to standards
- DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards
- MISRA-C:2004, Rule 13.6
- MISRA-C:2004, Rule 14.10
- MISRA-C:2004, Rule 15.3
- MISRA-C:2004, Rule 21.1
- “hisl\_0010: Usage of If blocks and If Action Subsystem blocks”
- “hisl\_0011: Usage of Switch Case blocks and Action Subsystem blocks”

## Display model version information

Display model version information in your report.

### Description

This check displays the following information for the current model:

- Version number
- Author
- Date
- Model checksum

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                  | Recommended Action                                                    |
|------------------------------------------------------------|-----------------------------------------------------------------------|
| Could not retrieve model version and checksum information. | This summary is provided for your information. No action is required. |

### See Also

- “Reports for Code Generation” in the Simulink Coder documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

## IEC 61508, ISO 26262, and EN 50128 Checks

**In this section...**

“IEC 61508, ISO 26262, and EN 50128 Checks Overview” on page 3-89

“Display model metrics and complexity report” on page 3-90

“Check for unconnected objects” on page 3-92

“Check for root Inports with missing properties” on page 3-93

“Check for MATLAB Function block interfaces with inherited properties” on page 3-95

“Check MATLAB Function block metrics” on page 3-97

“Check for root Inports with missing range definitions” on page 3-99

“Check for root Outports with missing range definitions” on page 3-101

“Check for blocks not recommended for C/C++ production code deployment” on page 3-103

“Check usage of Stateflow constructs” on page 3-104

“Check state machine type of Stateflow charts” on page 3-109

“Check for model objects that do not link to requirements” on page 3-111

“Check for inconsistent vector indexing methods” on page 3-113

“Check MATLAB Code Analyzer messages” on page 3-114

“Check MATLAB code for global variables” on page 3-116

“Check usage of Math Operations blocks” on page 3-117

“Check usage of Signal Routing blocks” on page 3-119

“Check usage of Logic and Bit Operations blocks” on page 3-120

“Check usage of Ports and Subsystems blocks” on page 3-122

“Display configuration management data” on page 3-125

## **IEC 61508, ISO 26262, and EN 50128 Checks Overview**

IEC 61508, ISO 26262, and EN 50128 checks facilitate designing and troubleshooting models, subsystems, and the corresponding generated code for applications to comply with IEC 61508-3, ISO 26262-6, or EN 50128.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the IEC 61508, ISO 26262, or EN 50128 checks.

### **Tips**

If your model uses model referencing, run the IEC 61508, ISO 26262, or EN 50128 checks on all referenced models before running them on the top-level model.

### **See Also**

- IEC 61508-3 Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements
- ISO 26262-6 Road vehicles - Functional safety - Part 6: Product development: Software level
- EN 50128 Railway applications - Communications, signalling and processing systems - Software for railway control and protection systems
- Embedded Coder documentation:
  - “IEC 61508 Standard”
  - “ISO 26262 Standard”
  - “EN 50128 Standard”

## Display model metrics and complexity report

Display number of elements and name, level, and depth of subsystems for the model or subsystem.

### Description

The IEC 61508, ISO 26262, and EN 50128 standards recommend the usage of size and complexity metrics to assess the software under development. This check provides metrics information for the model. The provided information can be used to inspect whether the size or complexity of the model or subsystem exceeds given limits. The check displays:

- A block count for each Simulink block type contained in the given model.
- The maximum subsystem depth of the given model.
- A count of Stateflow constructs in the given model (if applicable).
- Name, level, and depth of the subsystems contained in the given model (if applicable).

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition | Recommended Action                                                    |
|-----------|-----------------------------------------------------------------------|
| N/A       | This summary is provided for your information. No action is required. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- IEC 61508-3, Table A.9 (5) - Software complexity metrics
- ISO 26262-6, Table 1 (1a) - Enforcement of low complexity, Table 4 (1a) - Hierarchical structure of software components, Table 4 (1b) - Restricted size of software components, and Table 4 (1c) - Restricted size of interfaces

- EN 50128, Table A.12 (8) - Limited size and complexity of Functions, Subroutines and Methods and (9) Limited number of subroutine parameters
- sldiagnostics in the Simulink documentation
- “Cyclomatic Complexity” in the Simulink Verification and Validation documentation

## Check for unconnected objects

Identify unconnected lines, input ports, and output ports in the model.

### Description

Unconnected objects are likely to cause problems propagating signal attributes such as data, type, sample time, and dimensions.

Ports connected to Ground or Terminator blocks pass this check.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                            | Recommended Action                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| There are unconnected lines, input ports, or output ports in the model or subsystem. | <ul style="list-style-type: none"><li>• Double-click an element in the list of unconnected items to locate the item in the model diagram.</li><li>• Connect the objects identified in the results.</li></ul> |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- IEC 61508-3, Table A.3 (3) - Language subset
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128, Table A.4 (11) - Language Subset
- “Signal Basics”



## Check for root Inports with missing properties

Identify root model Inport blocks with missing or inherited sample times, data types or port dimensions.

### Description

Using root model Inport blocks that do not have defined sample time, data types or port dimensions can lead to undesired simulation results. Simulink back-propagates dimensions, sample times, and data types from downstream blocks unless you explicitly assign these values. When you run the check, a results table provides links to Inport blocks that do not pass, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                    | Recommended Action                                                                                                                                                                |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Missing port dimension</b> — Model contains Inport blocks with inherited port dimensions. | For the listed Inport blocks, specify port dimensions.                                                                                                                            |
| <b>Missing signal data type</b> — Model contains Inport blocks with inherited data types.    | For the listed Inport blocks, specify data types.                                                                                                                                 |
| <b>Missing port sample time</b> — Model contains Inport blocks with inherited sample times.  | For the listed Inport blocks, specify sample times. The sample times for root Inports with bus type must match the sample times specified at the leaf elements of the bus object. |

### Tips

The following configuration passes this check:

- Inport blocks with inherited sample times in conjunction with the **Periodic sample time constraint** menu set to **Ensure sample time independent**

### See Also

- IEC 61508-3, Table B.9 (5) - Fully defined interface
- ISO 26262-4, Table 2 (2) - Precisely defined interfaces
- ISO 26262-6, Table 1 (1f) - Use of unambiguous graphical representation
- EN 50128, Table A.3 (19) - Fully Defined Interface
- “Data Types” in the Simulink documentation
- “Determine Output Signal Dimensions” in the Simulink documentation
- “Specify Sample Time” in the Simulink documentation

## Check for MATLAB Function block interfaces with inherited properties

Identify MATLAB Function blocks that have inputs, outputs or parameters with inherited complexity or data type properties.

### Description

The check identifies MATLAB Function blocks with inherited complexity or data type properties. A results table provides links to MATLAB Function blocks that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                         | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MATLAB Function blocks have inherited interfaces. | <p>Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Function block identified in the results.</p> <p>If applicable, using the “MATLAB Function Block Editor”, make the following modifications in the “Ports and Data Manager”:</p> <ul style="list-style-type: none"> <li>• Change <b>Complexity</b> from Inherited to On or Off.</li> <li>• Change <b>Type</b> from Inherit: Same as Simulink to an explicit type.</li> </ul> <p>In the results table, <b>Compiled Value</b> provides suggestions for the actual values after the model compiles. If a MATLAB Function</p> |

| <b>Condition</b> | <b>Recommended Action</b>                                                                                                                                                                                                                                                                                         |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | block is defined within a library, explicitly define the interface in the library rather than in the referencing model. If your model has multiple instances of MATLAB Function blocks defined in a library block, and the instances have different interface properties, consider using multiple library blocks. |

**See Also**

- IEC 61508-3, Table B.9 (5) - Fully defined interface
- ISO 26262-6, Table 1 (1f) - Use of unambiguous graphical representation
- EN 50128, Table A.1 (11) - Software Interface Specifications
- “himl\_0002: Strong data typing at MATLAB function boundaries”

## Check MATLAB Function block metrics

Display complexity and code metrics for MATLAB Function blocks and external MATLAB functions. Report metric violations.

### Description

The IEC 61508, ISO 26262, and EN 50128 standards recommend the usage of size and complexity metrics to assess the software under development. This check provides complexity and code metrics for MATLAB Function blocks and external MATLAB functions. The check additionally reports metric violations.

A results table provides links to MATLAB Function blocks and external MATLAB functions that violate the complexity input parameters.

Available with Simulink Verification and Validation.

### Input Parameters

#### Maximum effective lines of code per function

Provide the maximum effective lines of code per function. Effective lines do not include empty lines, comment lines, or lines with a function end keyword.

#### Minimum density of comments

Provide minimum density of comments. Density is ratio of comment lines to total lines of code.

#### Maximum cyclomatic complexity per function

Provide maximum cyclomatic complexity per function. Cyclomatic complexity is the number of linearly independent paths through the source code.

## Results and Recommended Actions

| Condition                                                                                    | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MATLAB Function blocks or external MATLAB functions violate the complexity input parameters. | <p>For the MATLAB Function block or external MATLAB function:</p> <ul style="list-style-type: none"><li>• If effective lines of code is too high, further divide the MATLAB function.</li><li>• If comment density is too low, add comment lines.</li><li>• If cyclomatic complexity per function is too high, further divide the MATLAB function.</li></ul> |

### See Also

- IEC 61508-3, Table B.9 (5) - Fully defined interface
- ISO 26262-6, Table 1 (1f) - Use of unambiguous graphical representation
- EN 50128, Table A.1(11) - Software Interface Specifications
- “himl\_0003: Limitation of MATLAB function complexity”

## Check for root Inports with missing range definitions

Identify root level Inport blocks with missing or erroneous minimum or maximum range values.

### Description

The check identifies root level Inport blocks with missing or erroneous minimum or maximum range values. To have a precise and static definition of the interface range, you should specify the range at the Inport. A results table provides links to Inport blocks that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                   | Recommended Action                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Missing range at Inport</b> — Model contains Inport blocks with numeric data types that have missing range parameters (minimum and/or maximum).                          | Specify scalar minimum and maximum parameters for the listed Inport blocks.                                                                                                                                                                                                                       |
| <b>Missing range(s) at bus object</b> — Bus objects defining the Inport blocks have leaf elements with missing ranges.                                                      | To specify the model interface range, provide scalar minimum and maximum parameters for the listed leaf elements.                                                                                                                                                                                 |
| <b>Range specified at Inport will be ignored</b> — Minimum or maximum values at Inports are not supported for bus data types. The values are ignored during range checking. | To enable range checking, specify minimum and maximum signal values on the leaf elements of the bus objects defining the data type.<br><br>To enable the use of minimum and maximum values with bus objects, set configuration parameter <b>Diagnostics &gt; Connectivity &gt; Buses &gt; Mux</b> |

| Condition                                                                                 | Recommended Action                                 |
|-------------------------------------------------------------------------------------------|----------------------------------------------------|
|                                                                                           | <b>blocks used to create bus signals</b> to error. |
| <b>No data type specified</b> — Model contains Inport blocks with no data type specified. | Specify a supported data type.                     |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- IEC 61508-3, Table B.9 (5) – Fully defined interface
- ISO 26262-6, Table 2 (2) – Precisely defined interfaces
- EN 50128, Table A.1(11) – Software Interface Specifications, Table A.3(19) – Fully Defined Interface
- “hisl\_0025: Design min/max specification of input interfaces”



## Check for root Outports with missing range definitions

Identify root level Outport blocks with missing or erroneous minimum or maximum range values.

### Description

The check identifies root level Outport blocks with missing or erroneous minimum or maximum range values. To have a precise and static definition of the interface range, you should specify the range at the Outport. A results table provides links to Outport blocks that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                            | Recommended Action                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Missing range at Outport</b> — Model contains Outport blocks with numeric data types that have missing range parameters (minimum and/or maximum). | Specify scalar minimum and maximum parameters for the listed Outport blocks.                                      |
| <b>Missing range(s) at bus object</b> — Bus objects defining the Outport blocks have leaf elements with missing ranges.                              | To specify the model interface range, provide scalar minimum and maximum parameters for the listed leaf elements. |

| Condition                                                                                                                                                                           | Recommended Action                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Range specified at Output will be ignored</b> — Minimum or maximum values at Outports are not supported for bus data types. The values are ignored during range checking.</p> | <p>To enable range checking, specify minimum and maximum signal values on the leaf elements of the bus objects defining the data type.</p> <p>To enable the use of minimum and maximum values with bus objects, set configuration parameter <b>Diagnostics &gt; Connectivity &gt; Buses &gt; Mux blocks used to create bus signals</b> to error.</p> |
| <p><b>No bus data type specified</b> — Outport blocks have a bus signals entering with no bus data type specified.</p>                                                              | <p>Provide a bus object for the Outport block data type.</p>                                                                                                                                                                                                                                                                                         |

**Capabilities and Limitations**

You can run this check on your library models.

**See Also**

- IEC 61508-3, Table B.9 (5) – Fully defined interface
- ISO 26262-6, Table 2 (2) - Precisely defined interfaces
- EN 50128, Table A.1(11) – Software Interface Specifications, Table A.3(19) – Fully Defined Interface
- “hisl\_0026: Design min/max specification of output interfaces”

## Check for blocks not recommended for C/C++ production code deployment

Identify blocks not supported by code generation or not recommended for C/C++ production code deployment.

### Description

This check partially identifies model constructs that are not recommended for C/C++ production code generation as identified in the Simulink Block Support tables for Simulink Coder and Embedded Coder. If you are using blocks with support notes for code generation, review the information and follow the given advice.

Available with Simulink Verification and Validation and Embedded Coder.

### Results and Recommended Actions

| Condition                                                                                      | Recommended Action                                                                                                             |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| The model or subsystem contains blocks that should not be used for production code deployment. | Consider replacing the blocks listed in the results. Click an element from the list of questionable items to locate condition. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- IEC 61508-3, Table A.3 (3) - Language subset
- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.4 (11) - Language Subset
- “Supported Products and Block Usage”

## Check usage of Stateflow constructs

Identify usage of Stateflow constructs that might impact safety.

### Description

This check identifies instances of Stateflow software being used in a way that can impact an application's safety, including:

- Use of strong data typing
- Port name mismatches
- Scope of data objects and events
- Formatting of state action statements
- Ordering of states and transitions
- Unreachable code
- Indeterminate execution time

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                    | Recommended Action                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A Stateflow chart is not configured for strong data typing on boundaries between a Simulink model and the Stateflow chart. See:</p> <ul style="list-style-type: none"> <li>• “hisf_0009: Strong data typing (Simulink and Stateflow boundary)”</li> <li>• IEC 61508-3, Table A.3 (2) - Strongly typed programming language</li> <li>• ISO 26262-6, Table 1 (1c) - Enforcement of strong typing</li> </ul> | <p>In the Chart properties dialog box, select <b>Use Strong Data Typing with Simulink I/O</b> for the Stateflow chart. When you select this check box, the Stateflow chart accepts input signals of any data type that Simulink models support, provided that the type of the input signal matches the type of the corresponding Stateflow input data object.</p> |

| Condition                                                                                                                                                                                                                                                                                                           | Recommended Action                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• EN 50128, Table A.4 (8) - Strongly Typed Programming Language</li> <li>• MISRA-C:2004, Rules 10.1, 10.2, 10.3, and 10.4</li> </ul>                                                                                                                                         |                                                                                                                                                                                                                        |
| <p>Signals have names that differ from those of their corresponding Stateflow ports. See:</p> <ul style="list-style-type: none"> <li>• IEC 61508-3, Table A.3 (3) - Language subset</li> <li>• ISO 26262-6, Table 1 (1b) - Use of language subsets</li> <li>• EN 50128, Table A.4 (11) - Language Subset</li> </ul> | <ul style="list-style-type: none"> <li>• Check whether the ports are connected and, if not, fix the connections.</li> <li>• Change the names of the signals or the Stateflow ports so that the names match.</li> </ul> |
| <p>Local data is not defined in the Stateflow hierarchy at the chart level or below. See:</p> <ul style="list-style-type: none"> <li>• IEC 61508-3, Table A.3 (3) - Language subset</li> <li>• ISO 26262-6, Table 1 (1b) - Use of language subsets</li> <li>• EN 50128, Table A.4 (11) - Language Subset</li> </ul> | <p>Define local data at the chart level or below.</p>                                                                                                                                                                  |

| <b>Condition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Recommended Action</b>                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <p>A new line is missing from a state action after:</p> <ul style="list-style-type: none"> <li>• An entry (en), during (du), or exit (ex) statement</li> <li>• The semicolon (;) at the end of an assignment statement</li> </ul> <p>See:</p> <ul style="list-style-type: none"> <li>• IEC 61508-3, Table A.3 (3) - Language subset</li> <li>• ISO 26262-6, Table 1 (1b) - Use of language subsets</li> <li>• EN 50128, Table A.4 (11) - Language Subset</li> </ul> | <p>Add missing new lines.</p>                                                                                                       |
| <p>Stateflow charts have <b>User specified state/transition execution order</b> cleared. See:</p> <ul style="list-style-type: none"> <li>• “hisf_0002: User-specified state/transition execution order”</li> <li>• IEC 61508-3, Table A.3 (3) - Language subset</li> <li>• ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1f) - Use of unambiguous graphical representation</li> <li>• EN 50128, Table A.4 (11) - Language Subset</li> </ul>         | <p>For the specified charts, in the Chart Properties dialog box, select <b>User specified state/transition execution order</b>.</p> |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Any of the following debugging options are cleared:</p> <ul style="list-style-type: none"> <li>• <b>Enable debugging/animation</b></li> <li>• <b>Enable overflow detection (with debugging)</b></li> <li>• <b>Transition Conflict</b></li> <li>• <b>Data Range</b></li> <li>• <b>Detect Cycles</b></li> </ul> <p>See:</p> <ul style="list-style-type: none"> <li>• “hisf_0011: Stateflow debugging settings”</li> <li>• IEC 61508-3, Table A.7 (2) - Simulation/modeling</li> <li>• ISO 26262-6, Table 1 (1d) - Use of defensive implementation techniques</li> <li>• EN 50128, Table A.3 (1) - Defensive Programming, Table A.11 (13) Simulation</li> </ul> | <p>Select the debugging options. In the Configuration Parameters dialog box, select:</p> <ul style="list-style-type: none"> <li>• <b>Simulation</b><br/><b>Target &gt; General &gt; Enable debugging/animation</b></li> <li>• <b>Simulation</b><br/><b>Target &gt; General &gt; Enable overflow detection (with debugging)</b></li> </ul> <p>In the Stateflow Debugging dialog box, select:</p> <ul style="list-style-type: none"> <li>• <b>Transition Conflict</b></li> <li>• <b>Data Range</b></li> <li>• <b>Detect Cycles</b></li> </ul> |
| <p>The Stateflow chart contains a data object identifier defined in two or more scopes. See:</p> <ul style="list-style-type: none"> <li>• “hisl_0061: Unique identifiers for clarity”</li> <li>• IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (5) - Design and coding standards</li> <li>• ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1e) - Use of established design</li> </ul>                                                                                                                                                                                                                                                  | <p>For the identified chart, do one of the following:</p> <ul style="list-style-type: none"> <li>• Create a unique data object identifier within each of the scopes.</li> <li>• Create a unique data object identifier within the chart, at the parent level.</li> </ul>                                                                                                                                                                                                                                                                    |

| <b>Condition</b>                                                                                                                                                                                                                                          | <b>Recommended Action</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| principles, Table 1 (1h) - Use of naming conventions <ul style="list-style-type: none"><li>• EN 50128, Table A.4 (11) - Language Subset, Table A.12 (1) - Coding Standard, Table A.12 (2) - Coding Style Guide</li><li>• MISRA-C:2004, Rule 5.6</li></ul> |                           |

### **Capabilities and Limitations**

This check does not support charts that use MATLAB as the action language.

### **See Also**

See the following topics in the Stateflow documentation:

- “Strong Data Typing with Simulink I/O”
- “Property Fields”
- “How Events Work in Stateflow Charts”
- “Add Data”
- “Label States”
- “Chart Properties”
- “Chart Architecture”



## Check state machine type of Stateflow charts

Identify whether Stateflow charts are all Mealy or all Moore charts.

### Description

Compares the state machine type of all Stateflow charts to the type that you specify in the input parameters.

Available with Simulink Verification and Validation.

### Input Parameters

#### Mealy or Moore

Check whether charts use the same state machine type, and are all Mealy or all Moore charts.

#### Mealy

Check whether all charts are Mealy charts.

#### Moore

Check whether all charts are Moore charts.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                   | Recommended Action                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The input parameter is set to Mealy or Moore and charts in the model use either of the following: <ul style="list-style-type: none"> <li>• Classic state machine types.</li> <li>• Multiple state machine types.</li> </ul> | For each chart, in the Chart Properties dialog box, specify <b>State Machine Type</b> to either Mealy or Moore. Use the same state machine type for all charts in the model. |
| The input parameter is set to Mealy and charts in the model use other state machine types.                                                                                                                                  | For each chart, in the Chart Properties dialog box, specify <b>State Machine Type</b> to Mealy.                                                                              |
| The input parameter is set to Moore and charts in the model use other state machine types.                                                                                                                                  | For each chart, in the Chart Properties dialog box, specify <b>State Machine Type</b> to Moore.                                                                              |

### **Capabilities and Limitations**

You can run this check on your library models.

### **See Also**

- IEC 61508-3, Table A.7 (2) - Simulation/modeling
- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.11 (3) - Simulation
- “hisf\_0001: Mealy and Moore semantics”
- “Overview of Mealy and Moore Machines” in the Stateflow documentation.
- “Chart Properties”
- “Chart Architecture”

## Check for model objects that do not link to requirements

Check whether Simulink blocks and Stateflow objects link to a requirements document.

### Description

This check verifies whether Simulink blocks and Stateflow objects link to a document containing engineering requirements for traceability.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                      | Recommended Action                                                                                |
|------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Blocks do not link to a requirements document. | Link to requirements document. See “Link to Requirements Document Using Selection-Based Linking”. |

### Capabilities and Limitations

- You can run this check on your library models.
- When you run this check, the Model Advisor does not follow library links or look under masks.

### Tip

Run this check from the top model or subsystem that you want to check.

### See Also

- IEC 61508-3, Table A.1 (1) - Computer-aided specification tools, Table A.2 (8) - Computer-aided specification tools, Table A.8 (1) - Impact analysis
- ISO 26262-6, Table 8 (1a) - Documentation of the software unit design in natural language

- EN 50128, Table A.3 (23) - Modeling supported by computer aided design and specification tools, Table A.10 (1) - Impact Analysis
- “Requirements Traceability”

## Check for inconsistent vector indexing methods

Identify blocks with inconsistent indexing method.

### Description

Using inconsistent block indexing methods can result in modeling errors. You should use a consistent vector indexing method for all blocks. This check identifies blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                    | Recommended Action                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| The model or subsystem contains blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified. | Modify the model to use a single consistent indexing method. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- IEC 61508–3, Table A.3 (3) - Language subset, Table A.4 (5) - Design and coding standards
- ISO 26262-6, Table 1 (b) - Use of language subsets, Table 1 (f) - Use of unambiguous graphical representation
- EN 50128, Table A.4 (11) - Language Subset, Table A.12 (1) - Coding Standard
- “hisl\_0021: Consistent vector indexing method”

## Check MATLAB Code Analyzer messages

Check MATLAB Functions for  `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs.

### Description

Verifies  `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs for:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                            | Recommended Action                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| For MATLAB code in MATLAB Function blocks, either of the following: <ul style="list-style-type: none"> <li>• Code lines are not justified with a <code> %#ok</code> comment.</li> <li>• Codes lines justified with <code> %#ok</code> do not specify a message id.</li> </ul>        | <ul style="list-style-type: none"> <li>• Implement MATLAB Code Analyzer recommendations.</li> <li>• Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment.</li> <li>• Specify justified code lines with a message id. For example, <code> %#ok&lt;NOPRT&gt;</code>.</li> </ul> |
| For MATLAB functions defined in Stateflow charts, either of the following: <ul style="list-style-type: none"> <li>• Code lines are not justified with a <code> %#ok</code> comment.</li> <li>• Codes lines justified with <code> %#ok</code> do not specify a message id.</li> </ul> | <ul style="list-style-type: none"> <li>• Implement MATLAB Code Analyzer recommendations.</li> <li>• Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment.</li> <li>• Specify justified code lines with a message id. For example, <code> %#ok&lt;NOPRT&gt;</code>.</li> </ul> |
| For called MATLAB functions:                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Insert <code> %#codegen</code> directive in the MATLAB code.</li> </ul>                                                                                                                                                                                                      |

| Condition                                                                                                                                                                                                                                                                      | Recommended Action                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Code does not have the <code> %#codegen</code> directive.</li> <li>• Code lines are not justified with a <code> %#ok</code> comment.</li> <li>• Codes lines justified with <code> %#ok</code> do not specify a message id.</li> </ul> | <ul style="list-style-type: none"> <li>• Implement MATLAB Code Analyzer recommendations.</li> <li>• Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment.</li> <li>• Specify justified code lines with a message id. For example, <code> %#ok&lt;NOPRT&gt;</code>.</li> </ul> |

### See Also

- IEC 61508-3, Table A.3 (3) – Language subset, IEC 61508-3, Table A.4 (3) – Defensive programming
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- “Check Code for Errors and Warnings”
- “himl\_0004: MATLAB Code Analyzer recommendations for code generation”

## Check MATLAB code for global variables

Check for global variables in MATLAB code.

### Description

Verifies that global variables are not used in any of the following:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                       | Recommended Action                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Global variables are used in one or more of the following: <ul style="list-style-type: none"> <li>• MATLAB code in MATLAB Function blocks</li> <li>• MATLAB functions defined in Stateflow charts</li> <li>• Called MATLAB functions</li> </ul> | Replace global variables with signal lines, function arguments, or persistent data. |

### See Also

- IEC 61508-3, Table A.3 (3) – Language subset
- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.4 (11) - Language Subset
- “himl\_0005: Usage of global variables in MATLAB functions”



## Check usage of Math Operations blocks

Identify usage of Math Operation blocks that might impact safety.

### Description

This check inspects the usage of the following blocks:

- Abs
- Assignment
- Gain

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The model or subsystem contains an Absolute Value block that is operating on one of the following:</p> <ul style="list-style-type: none"> <li>• A boolean or an unsigned input data type. This condition results in unreachable simulation pathways through the model and might result in unreachable code</li> <li>• A signed integer value with the <b>Saturate on integer overflow</b> check box not selected. For signed data types, the absolute value of the most negative value is problematic because it is not representable by the data type.</li> </ul> | <p>If the identified Absolute Value block is operating on a boolean or unsigned data type, do one of the following:</p> <ul style="list-style-type: none"> <li>• Change the input of the Absolute Value block to a signed input type.</li> <li>• Remove the Absolute Value block from the model.</li> </ul> <p>If the identified Absolute Value block is operating on a signed data type, in the <b>Block Parameters &gt; Signal Attributes</b> dialog box, select <b>Saturate on integer overflow</b>.</p> |

| Condition                                                                                                                                                                                      | Recommended Action                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| This condition results in an overflow in the generated code.                                                                                                                                   |                                                                                                                                                           |
| The model or subsystem contains Gain blocks with a of value 1.                                                                                                                                 | If you are using Gain blocks as buffers, consider replacing them with Signal Conversion blocks.                                                           |
| The model or subsystem might contain Assignment blocks with incomplete array initialization that do not have block parameter <b>Action if any output element is not assigned</b> set to Error. | When using the Assignment block with incompleated array initialization, set block parameter <b>Action if any output element is not assigned</b> to Error. |

**See Also**

- IEC 61508-3, Table A.3 (3) – Language subset, IEC 61508-3, Table A.4 (3) – Defensive programming, Table B.8 (3) – Control Flow Analysis
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques, Table 7 (1f) - Control flow analysis
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming, Table A.19 (3) - Control Flow Analysis
- MISRA-C:2004, Rule 14.1
- MISRA-C:2004, Rule 21.1
- “hisl\_0001: Usage of Abs block”
- “hisl\_0029: Usage of Assignment blocks”

## Check usage of Signal Routing blocks

Identify usage of Signal Routing blocks that might impact safety.

### Description

This check identifies model or subsystem Switch blocks that might generate code with inequality operations ( $\sim=$ ) in expressions that contain a floating-point variable or constant.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                         | Recommended Action                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The model or subsystem contains a Switch block that might generate code with inequality operations (<math>\sim=</math>) in expressions where at least one side of the expression contains a floating-point variable or constant. The Switch block might cause floating-point inequality comparisons in the generated code.</p> | <p>For the identified block, do one of the following:</p> <ul style="list-style-type: none"> <li>• For the control input block, change the <b>Data type</b> parameter setting.</li> <li>• Change the Switch block <b>Criteria for passing first input</b> parameter setting. This might change the algorithm.</li> </ul> |

### See Also

- IEC 61508-3, Table A.3 (3) – Language subset, Table A.4 (3) – Defensive programming
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- MISRA-C:2004, Rule 13.3

## Check usage of Logic and Bit Operations blocks

Identify usage of Logical Operator and Bit Operations blocks that might impact safety.

### Description

This check inspects the usage of:

- Blocks that compute relational operators, including Relational Operator, Compare To Constant, Compare To Zero, and Detect Change blocks
- Logical Operator blocks

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                                                                                                                            | Recommended Action                                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The model or subsystem contains a block computing a relational operator that is operating on different data types. The condition can lead to unpredictable results in the generated code.                                                                                                                                                            | On the <b>Block Parameters &gt; Signal Attributes</b> pane, set the <b>Output data type</b> to boolean for the specified blocks.                                                                                                 |
| The model or subsystem contains a block computing a relational operator that uses the == or ~= operator to compare floating-point signals. The use of these operators on floating-point signals is unreliable and unpredictable because of floating-point precision issues. These operators can lead to unpredictable results in the generated code. | For the identified block, do one of the following: <ul style="list-style-type: none"> <li>• Change the signal data type.</li> <li>• Rework the model to eliminate using == or ~= operators on floating-point signals.</li> </ul> |
| The model or subsystem contains a Logical Operator block that has inputs or outputs that are not                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Modify the Logical Operator block so that the inputs and outputs are Boolean. On the</li> </ul>                                                                                         |

| Condition                                                                                                                            | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Boolean inputs or outputs. The block might result in floating-point equality or inequality comparisons in the generated code.</p> | <p><b>Block Parameters &gt; Signal Attributes</b> pane, consider selecting <b>Require all inputs to have the same data type</b> and setting <b>Output data type</b> to boolean.</p> <ul style="list-style-type: none"> <li>• In the Configuration Parameters dialog box, on the <b>Optimization</b> pane, consider selecting the <b>Implement logic signals as boolean data (vs. double)</b>.</li> </ul> |

### See Also

- IEC 61508-3, Table A.3 (2) – Strongly typed programming language, Table A.3 (3) – Language subset, Table A.4 (3) - Defensive programming
- ISO 26262-6, Table 1 (1c) - Enforcement of strong typing, Table 1 (1b) - Use of language subsets
- EN 50128 - Table A.4 (8) - Strongly Typed Programming Language, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- MISRA-C:2004, Rule 13.3
- “hisl\_0016: Usage of blocks that compute relational operators”
- “hisl\_0017: Usage of blocks that compute relational operators (2)”

## Check usage of Ports and Subsystems blocks

Identify usage of Ports and Subsystems blocks that might impact safety.

### Description

This check inspects the usage of:

- For Iterator blocks
- While Iterator blocks
- If blocks
- Switch Case blocks

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                   | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The model or subsystem contains a For Iterator block that has variable iterations. This condition can lead to unpredictable execution times or infinite loops in the generated code.</p> | <p>For the identified For Iterator blocks, do one of the following:</p> <ul style="list-style-type: none"> <li>• Set the <b>Iteration limit source</b> parameter to <code>internal</code>.</li> <li>• If the <b>Iteration limit source</b> parameter must be <code>external</code>, use a Constant, Probe, or Width block as the source.</li> <li>• Clear the <b>Set next i (iteration variable) externally</b> check box.</li> <li>• Consider selecting the <b>Show iteration variable</b> check box and observe the iteration value during simulation.</li> </ul> |
| <p>The model or subsystem contains a While Iterator block that has unlimited iterations. This condition</p>                                                                                 | <p>For the identified While Iterator blocks:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Condition                                                                                                                                                                     | Recommended Action                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| can lead to infinite loops in the generated code.                                                                                                                             | <ul style="list-style-type: none"> <li>• Set the <b>Maximum number of iterations (-1 for unlimited)</b> parameter to a positive integer value.</li> <li>• Consider selecting the <b>Show iteration number port</b> check box and observe the iteration value during simulation.</li> </ul> |
| The model or subsystem contains an If block with an If expression or Elseif expressions that might cause floating-point equality or inequality comparisons in generated code. | Modify the expressions in the If block to avoid floating-point equality or inequality comparisons in generated code.                                                                                                                                                                       |
| The model or subsystem contains an If block using Elseif expressions without an Else condition.                                                                               | In the If block <b>Block Parameters</b> dialog box, select <b>Show else condition</b> . Connect the resulting Else output port to an If Action Subsystem block.                                                                                                                            |
| The model or subsystem contains an If block with output ports that do not connect to If Action Subsystem blocks.                                                              | Verify that output ports of the If block connect to If Action Subsystem blocks.                                                                                                                                                                                                            |
| The model or subsystem contains an Switch Case block without a default case.                                                                                                  | In the Switch Case block <b>Block Parameters</b> dialog box, select <b>Show default case</b> . Connect the resulting default output port to a Switch Case Action Subsystem block.                                                                                                          |
| The model or subsystem contains a Switch Case block with an output port that does not connect to a Switch Case Action Subsystem block.                                        | Verify that output ports of the Switch Case blocks connect to Switch Case Action Subsystem blocks.                                                                                                                                                                                         |

### See Also

- IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (3) - Defensive programming
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128 - Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- MISRA-C:2004, Rule 13.6, Rule 14.10, Rule 15.3, Rule 21.1
- “hisl\_0010: Usage of If blocks and If Action Subsystem blocks”
- “hisl\_0011: Usage of Switch Case blocks and Action Subsystem blocks”



## Display configuration management data

Display model configuration and checksum information.

### Description

This informer check displays the following information for the current model:

- Model version number
- Model author
- Date
- Model checksum

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                  | Recommended Action                                                    |
|------------------------------------------------------------|-----------------------------------------------------------------------|
| Could not retrieve model version and checksum information. | This summary is provided for your information. No action is required. |

### See Also

- IEC 61508-3, Table A.8 (5) – Software configuration management
- ISO 26262-8, Clause 7.4.2
- EN 50128, Table A.9 (5) - Software Configuration Management
- “How Simulink Helps You Manage Model Versions” in the Simulink documentation
- Model Change Log in the Simulink Report Generator™ documentation
- Simulink.BlockDiagram.getChecksum in the Simulink documentation
- Simulink.SubSystem.getChecksum in the Simulink documentation

## MathWorks Automotive Advisory Board Checks

**In this section...**

“MathWorks Automotive Advisory Board Checks Overview” on page 3-128

“Check font formatting” on page 3-129

“Check Transition orientations in flowcharts” on page 3-131

“Check for nondefault block attributes” on page 3-132

“Check signal line labels” on page 3-133

“Check for propagated signal labels” on page 3-135

“Check default transition placement in Stateflow charts” on page 3-136

“Check return value assignments of graphical functions in Stateflow charts” on page 3-137

“Check entry formatting in State blocks in Stateflow charts” on page 3-138

“Check usage of return values from a graphical function in Stateflow charts” on page 3-139

“Check for pointers in Stateflow charts” on page 3-140

“Check for event broadcasts in Stateflow charts” on page 3-141

“Check transition actions in Stateflow charts” on page 3-142

“Check for MATLAB expressions in Stateflow charts” on page 3-143

“Check for indexing in blocks” on page 3-144

“Check file names” on page 3-146

“Check folder names” on page 3-147

“Check for prohibited blocks in discrete controllers” on page 3-148

“Check for prohibited sink blocks” on page 3-149

“Check positioning and configuration of ports” on page 3-150

“Check for matching port and signal names” on page 3-152

“Check whether block names appear below blocks” on page 3-153

“Check for mixing basic blocks and subsystems” on page 3-154

**In this section...**

- “Check for unconnected ports and signal lines” on page 3-155
- “Check position of Trigger and Enable blocks” on page 3-156
- “Check usage of tunable parameters in blocks” on page 3-157
- “Check Stateflow data objects with local scope” on page 3-158
- “Check for Strong Data Typing with Simulink I/O” on page 3-159
- “Check usage of exclusive and default states in state machines” on page 3-160
- “Check Implement logic signals as Boolean data (vs. double)” on page 3-162
- “Check model diagnostic parameters” on page 3-163
- “Check the display attributes of block names” on page 3-166
- “Check display for port blocks” on page 3-167
- “Check subsystem names” on page 3-168
- “Check port block names” on page 3-170
- “Check character usage in signal labels” on page 3-171
- “Check character usage in block names” on page 3-173
- “Check Trigger and Enable block names” on page 3-175
- “Check for Simulink diagrams using nonstandard display attributes” on page 3-176
- “Check MATLAB code for global variables” on page 3-178
- “Check visibility of block port names” on page 3-179
- “Check orientation of Subsystem blocks” on page 3-181
- “Check usage of Relational Operator blocks” on page 3-182
- “Check usage of Switch blocks” on page 3-183
- “Check usage of buses and Mux blocks” on page 3-184
- “Check for bitwise operations in Stateflow charts” on page 3-185
- “Check for comparison operations in Stateflow charts” on page 3-187

**In this section...**

“Check for unary minus operations on unsigned integers in Stateflow charts” on page 3-188

“Check for equality operations between floating-point expressions in Stateflow charts” on page 3-189

“Check input and output settings of MATLAB Function blocks” on page 3-190

“Check MATLAB Function block metrics” on page 3-192

“Check for mismatches between names of Stateflow ports and associated signals” on page 3-194

“Check scope of From and Goto blocks” on page 3-195

## **MathWorks Automotive Advisory Board Checks Overview**

MathWorks Automotive Advisory Board (MAAB) checks facilitate designing and troubleshooting models from which code is generated for automotive applications.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the MAAB checks.

### **See Also**

- “Consult the Model Advisor” in the Simulink documentation
- “Simulink Checks” in the Simulink reference documentation
- “Simulink Coder Checks” in the Simulink Coder documentation
- “MAAB Control Algorithm Modeling” guidelines
- The MathWorks Automotive Advisory Board on the MathWorks Web site, which lists downloads for the latest version of *Control Algorithm Modeling Guidelines Using MATLAB, Simulink, and Stateflow*

## Check font formatting

Check for difference in font and font sizes.

### Description

With the exception of free text annotations within a model, text elements, such as block names, block annotations, and signal labels, must have the same font style and font size. Select a font style and font size that is legible and portable (convertible between platforms), such as Arial or Times New Roman 12 point.

Available with Simulink Verification and Validation.

### Input Parameters

#### Font Name

Apply the specified font to all text elements. When you specify **Common** (default), the check identifies different fonts used in your model.

Although you can specify other fonts, the fonts available from the drop-down list are **Arial**, **Courier New**, **Georgia**, **Times New Roman**, **Arial Black**, and **Verdana**.

#### Font Size

Apply the specified font size to all text elements. When you specify **Common** (default), the check identifies different font sizes used in your model. Although you can specify other font sizes, the font sizes available from the drop-down list are **6**, **8**, **9**, **10**, **12**, **14**, **16**.

#### Font Style

Apply the specified font style to all text elements. When you specify **Common** (default), the check identifies different font styles used in your model. The font styles available from the drop-down list are **normal**, **bold**, **italic**, and **bold italic**.

## Results and Recommended Actions

| Condition                                                                              | Recommended Action                                                                                                                                                                               |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The fonts or font sizes for text elements in the model are not consistent or portable. | Specify values for the font parameters and click <b>Modify all Fonts</b> , or manually change the fonts and font sizes of text elements in the model such that they are consistent and portable. |

## Capabilities and Limitations

You can run this check on your library models.

## Action Results

Clicking **Modify all Fonts** changes the font and font size of all text elements in the model according to the values you specify in the input parameters.

For the input parameters, if you specify **Common**, clicking **Modify all Fonts** changes the font and font sizes of all text elements in the model to the most commonly used fonts, font sizes, or font styles.

## See Also

MAAB guideline db\_0043: Simulink font and font size

## Check Transition orientations in flowcharts

Check transition orientations in flow charts.

### Description

The following rules apply to transitions in flow charts:

- Draw transition conditions horizontally.
- Draw transitions with a condition action vertically.

Loop constructs are exceptions to these rules.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                            | Recommended Action |
|--------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| The model includes a transition with a condition that is not drawn horizontally or a transition action that is not drawn vertically. | Modify the model.  |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline db\_0132: Transitions in Flowcharts

## Check for nondefault block attributes

Identify blocks that use nondefault block parameter values that are not displayed in the model diagram.

### Description

Model diagrams should display block parameters that have values other than default values. One way of displaying this information is by using the **Block Annotation** tab in the Block Properties dialog box.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                 | Recommended Action                                                                                      |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Block parameters that have values other than default values, and the values are not in the model display. | In the Block Properties dialog, use the <b>Block Annotation</b> tab to add block parameter annotations. |

### Capabilities and Limitations

You can run this check on your library models.

### Tip

If you use the `add_block` function with `'built-in/blocktype'` as a source block path name for Simulink built-in blocks, some default parameter values of some blocks are different from the defaults that you get if you added those blocks interactively using Simulink.

### See Also

- MAAB guideline db\_0140: Display of basic block parameters
- For a list of block parameter default values, see “Block-Specific Parameters” in the Simulink documentation.
- `add_block` in the Simulink documentation



## Check signal line labels

Check the labeling on signal lines.

### Description

You should use a label to identify:

- Signals originating from the following blocks (the block icon exception noted below applies to all blocks listed, except Inport, Bus Selector, Demux, and Selector):

Bus Selector block (tool forces labeling)

Chart block (Stateflow)

Constant block

Data Store Read block

Demux block

From block

Inport block

Selector block

Subsystem block

---

**Block Icon Exception** If a signal label is visible in the display of the icon for the originating block, you do not have to display a label for the connected signal unless the signal label is required elsewhere due to a rule for signal destinations.

---

- Signals connected to one of the following destination blocks (directly or indirectly with a basic block that performs an operation that is not transformative):

Bus Creator block

Chart block (Stateflow)

Data Store Write block

Goto block

Mux block

Outport block

Subsystem block

- Any signal of interest.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                    | Recommended Action                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Signals coming from Bus Selector, Chart, Constant, Data Store Read, Demux, From, Inport, or Selector blocks are not labeled. | Double-click the line that represents the signal. After the text cursor appears, enter a name and click anywhere outside the label to exit label editing mode. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- MAAB guideline na\_0008: Display of labels on signals
- “Signal Labels” in the Simulink documentation

## Check for propagated signal labels

Check for propagated labels on signal lines.

### Description

You should propagate a signal label from its source rather than enter the signal label explicitly (manually) if the signal originates from:

- An Inport block in a nested subsystem. However, if the nested subsystem is a library subsystem, you can explicitly label the signal coming from the Inport block to accommodate reuse of the library block.
- A basic block that performs a nontransformative operation.
- A Subsystem or Stateflow Chart block. However, if the connection originates from the output of an instance of the library block, you can explicitly label the signal to accommodate reuse of the library block.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                | Recommended Action                                                                                                                           |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| The model includes signal labels that were entered explicitly, but should be propagated. | Use the open angle bracket (<) character to mark signal labels that should be propagated and remove the labels that were entered explicitly. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- MAAB guideline na\_0009: Entry versus propagation of signal labels
- “Signal Labels” in the Simulink documentation

## Check default transition placement in Stateflow charts

Check default transition placement in Stateflow charts.

### Description

In a Stateflow chart, you should connect the default transition at the top of the state and place the destination state of the default transition above other states in the hierarchy.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                         | Recommended Action                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| The default transition for a Stateflow chart is not connected at the top of the state.                            | Move the default transition to the top of the Stateflow chart.                                                                     |
| The destination state of a Stateflow chart's default transition is lower than other states in the same hierarchy. | Adjust the position of the default transition's destination state such that the state is above other states in the same hierarchy. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

- MAAB guideline jc\_0531: Placement of the default transition
- “Syntax for States and Transitions”

## Check return value assignments of graphical functions in Stateflow charts

Identify graphical functions with multiple assignments of return values in Stateflow charts.

### Description

The return value from a Stateflow graphical function must be set in only one place.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                            | Recommended Action                                                                    |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| The return value from a Stateflow graphical function is assigned in multiple places. | Modify the specified graphical function so that its return value is set in one place. |

### Capabilities and Limitations

- This check does not support charts that use MATLAB as the action language.
- You can run this check on your library models.

### See Also

- MAAB guideline jc\_0511: Setting the return value from a graphical function
- “When to Use Reusable Functions in Charts” in the Stateflow documentation

## Check entry formatting in State blocks in Stateflow charts

Identify missing line breaks between entry action (en), during action (du), and exit action (ex) entries in states. Identify missing line breaks after semicolons (;) in statements.

### Description

Start a new line after the entry, during, and exit entries, and after the completion of a statement “;”.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                              | Recommended Action                   |
|----------------------------------------|--------------------------------------|
| An entry (en) is not on a new line.    | Add a new line after the entry.      |
| A during (du) is not on a new line.    | Add a new line after the during.     |
| An exit (ex) is not on a new line.     | Add a new line after the exit.       |
| Multiple statements found on one line. | Add a new line after each statement. |

### Capabilities and Limitations

- This check does not support charts that use MATLAB as the action language.
- You can run this check on your library models.

### See Also

MAAB guideline jc\_0501: Format of entries in a State block

## Check usage of return values from a graphical function in Stateflow charts

Identify calls to graphical functions in conditional expressions.

### Description

Do not use the return value of a graphical function in a comparison operation.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                     | Recommended Action                                                                                                                                |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Conditional expressions contain calls to graphical functions. | Assign return values of graphical functions to intermediate variables. Use these intermediate variables in the specified conditional expressions. |

### Capabilities and Limitations

- This check does not support charts that use MATLAB as the action language.
- You can run this check on your library models.

### See Also

- MAAB guideline jc\_0521: Use of the return value from graphical functions
- “When to Use Reusable Functions in Charts” in the Stateflow documentation
- “Reuse Logic Patterns Using Graphical Functions” in the Stateflow documentation

## Check for pointers in Stateflow charts

Identify pointer operations on custom code variables.

### Description

Pointers to custom code variables are not allowed.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                     | Recommended Action                                                         |
|-----------------------------------------------|----------------------------------------------------------------------------|
| Custom code variables use pointer operations. | Modify the specified chart to remove the dependency on pointer operations. |

### Capabilities and Limitations

- This check does not support charts that use MATLAB as the action language.
- You can run this check on your library models.

### See Also

MAAB guideline jm\_0011: Pointers in Stateflow



## Check for event broadcasts in Stateflow charts

Identify undirected event broadcasts that might cause recursion during simulation and generate inefficient code.

### Description

Event broadcasts in Stateflow charts must be directed.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                        | Recommended Action                                                                                                                                                                                                          |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Event broadcasts are undirected. | Rearchitect the diagram to use directed event broadcasting. Use the send syntax or qualified event names to direct the event to a particular state. Use multiple send statements to direct an event to more than one state. |

### Capabilities and Limitations

- This check does not support charts that use MATLAB as the action language.
- You can run this check on your library models.

### See Also

- MAAB guideline jm\_0012: Event broadcasts
- “Broadcast Events to Synchronize States” in the Stateflow documentation

## Check transition actions in Stateflow charts

Identify missing line breaks between transition actions.

### Description

For readability, start each transition action on a new line.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                         | Recommended Action                                       |
|---------------------------------------------------|----------------------------------------------------------|
| Multiple transition actions are on a single line. | Verify that each transition action begins on a new line. |

### Capabilities and Limitations

- This check does not support charts that use MATLAB as the action language.
- You can run this check on your library models.

### See Also

- MAAB guideline db\_0151: State machine patterns for transition actions
- “Syntax for States and Transitions”

## Check for MATLAB expressions in Stateflow charts

Identify Stateflow objects that use MATLAB expressions that are not suitable for code generation.

### Description

Do not use MATLAB functions, instructions, and operators in Stateflow objects.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                 | Recommended Action                               |
|-------------------------------------------|--------------------------------------------------|
| Stateflow objects use MATLAB expressions. | Replace MATLAB expressions in Stateflow objects. |

### Capabilities and Limitations

- This check does not support charts that use MATLAB as the action language.
- You can run this check on your library models.

### See Also

- MAAB guideline db\_0127: MATLAB commands in Stateflow
- “Access Built-In MATLAB Functions and Workspace Data” in the Stateflow documentation

## Check for indexing in blocks

Check for blocks that do not use one-based indexing.

### Description

Available with Simulink Verification and Validation.

One-based indexing ([1, 2, 3,...]) is used for the following:

| Product  | Items                                                                                                                                                                                                                                                                                                                                |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MATLAB   | <ul style="list-style-type: none"> <li>• Workspace variables and structures</li> <li>• Local variables of MATLAB functions</li> <li>• Global variables</li> </ul>                                                                                                                                                                    |
| Simulink | <ul style="list-style-type: none"> <li>• Signal vectors and matrices</li> <li>• Parameter vectors and matrices</li> <li>• S-function input and output signal vectors and matrices in MATLAB-code</li> <li>• S-function parameter vectors and matrices in MATLAB-code</li> <li>• S-function local variables in MATLAB-code</li> </ul> |

Zero-based indexing ([0, 1, 2, ...]) is used for the following:

| Product   | Items                                                                                                                                                                                                                                                                                 |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Simulink  | <ul style="list-style-type: none"> <li>• S-function input and output signal vectors and matrices in C code</li> <li>• S-function input parameters in C code</li> <li>• S-function parameter vectors and matrices in C code</li> <li>• S-function local variables in C code</li> </ul> |
| Stateflow | <ul style="list-style-type: none"> <li>• Input and output signal vectors and matrices</li> </ul>                                                                                                                                                                                      |

| Product | Items                                                                                                                                                              |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | <ul style="list-style-type: none"> <li>• Parameter vectors and matrices</li> <li>• Local variables</li> <li>• Variables and structures in custom C code</li> </ul> |
| C code  | <ul style="list-style-type: none"> <li>• Local variables and structures</li> <li>• Global variables</li> </ul>                                                     |

### Results and Recommended Actions

| Condition                                                       | Recommended Action                                                   |
|-----------------------------------------------------------------|----------------------------------------------------------------------|
| Blocks in your model are not configured for one-based indexing. | Using block parameters, configure all blocks for one-based indexing. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

See MAAB guideline db\_0112: Indexing

## Check file names

Checks the names of all files residing in the same folder as the model

### Description

A file name conforms to constraints.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                              | Recommended Action                                                         |
|--------------------------------------------------------|----------------------------------------------------------------------------|
| The file name contains illegal characters.             | Rename the file. Allowed characters are a–z, A–Z, 0–9, and underscore (_). |
| The file name starts with a number.                    | Rename the file.                                                           |
| The file name starts with an underscore ("_").         | Rename the file.                                                           |
| The file name ends with an underscore ("_").           | Rename the file.                                                           |
| The file extension contains one (or more) underscores. | Change the file extension.                                                 |
| The file name has consecutive underscores.             | Rename the file.                                                           |
| The file name contains more than one dot (".").        | Rename the file.                                                           |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline ar\_0001: Filenames

## Check folder names

Checks model directory and subdirectory names for invalid characters.

### Description

A directory name conforms to constraints.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                           | Recommended Action                                                              |
|-----------------------------------------------------|---------------------------------------------------------------------------------|
| The directory name contains illegal characters.     | Rename the directory. Allowed characters are a–z, A–Z, 0–9, and underscore (_). |
| The directory name starts with a number.            | Rename the directory.                                                           |
| The directory name starts with an underscore ("_"). | Rename the directory.                                                           |
| The directory name ends with an underscore ("_").   | Rename the directory.                                                           |
| The directory name has consecutive underscores.     | Rename the directory.                                                           |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline ar\_0002: Directory names

## Check for prohibited blocks in discrete controllers

Check for prohibited blocks in discrete controllers.

### Description

You cannot include continuous blocks in controller models.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                            | Recommended Action                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Continuous blocks — Derivative, Integrator, State-Space, Transfer Fcn, Transfer Delay, Variable Time Delay, Variable Transport Delay, and Zero-Pole — are not permitted in models representing discrete controllers. | Replace continuous blocks with the equivalent blocks discretized in the s-domain by using the Discretizing library, as explained in “Discretize Blocks from the Simulink Model” in the Simulink documentation. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline jm\_0001: Prohibited Simulink standard blocks inside controllers



## Check for prohibited sink blocks

Check for prohibited Simulink sink blocks.

### Description

You must design controller models from discrete blocks. Sink blocks, such as the Scope block, are not allowed.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                              | Recommended Action                 |
|--------------------------------------------------------|------------------------------------|
| Sink blocks are not permitted in discrete controllers. | Remove sink blocks from the model. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline hd\_0001: Prohibited Simulink sinks

## Check positioning and configuration of ports

Check whether the model contains ports with invalid position and configuration.

### Description

In models, ports must comply with the following rules:

- Place Inport blocks on the left side of the diagram. Move the Inport block right only to prevent signal crossings.
- Place Outport blocks on the right side of the diagram. Move the Outport block left only to prevent signal crossings.
- Avoid using duplicate Inport blocks at the subsystem level if possible.
- Do not use duplicate Inport blocks at the root level.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                   | Recommended Action                                                                                                                                                                                               |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inport blocks are too far to the right and result in left-flowing signals.  | Move the specified Inport blocks to the left.                                                                                                                                                                    |
| Outport blocks are too far to the left and result in right-flowing signals. | Move the specified Output blocks to the right.                                                                                                                                                                   |
| Ports do not have the default orientation.                                  | Modify the model diagram such that signal lines for output ports enter the side of the block and signal lines for input ports exit the right side of the block.                                                  |
| Ports are duplicate Inport blocks.                                          | <ul style="list-style-type: none"> <li>• If the duplicate Inport blocks are in a subsystem, remove them where possible.</li> <li>• If the duplicate Inport blocks are at the root level, remove them.</li> </ul> |

**Capabilities and Limitations**

You can run this check on your library models.

**See Also**

MAAB guideline db\_0042: Port block in Simulink models

Available with Simulink Verification and Validation.

## Check for matching port and signal names

Check for mismatches between names of ports and corresponding signals.

### Description

Use matching names for ports and their corresponding signals.

Available with Simulink Verification and Validation.

### Prerequisite

Prerequisite MAAB guidelines for this check are:

- db\_0042: Port block in Simulink models
- na\_0005: Port block name visibility in Simulink models

### Results and Recommended Actions

| Condition                                                      | Recommended Action                                                        |
|----------------------------------------------------------------|---------------------------------------------------------------------------|
| Ports have names that differ from their corresponding signals. | Change the port name or the signal name to match the name for the signal. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline jm\_0010: Port block names in Simulink models

## Check whether block names appear below blocks

Check whether block names appear below blocks.

### Description

If shown, the name of the block should appear below the block.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                              | Recommended Action                                    |
|--------------------------------------------------------|-------------------------------------------------------|
| Blocks have names that do not appear below the blocks. | Set the name of the block to appear below the blocks. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline db\_0142: Position of block names

## Check for mixing basic blocks and subsystems

Check for systems that mix primitive blocks and subsystems.

### Description

You must design each level of a model with building blocks of the same type, for example, only subsystems or only primitive (basic) blocks. If you mask your subsystem and set `MaskType` to a non-empty string, the subsystem is seen as a basic block.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                 | Recommended Action                         |
|---------------------------------------------------------------------------|--------------------------------------------|
| A level in the model includes both subsystem blocks and primitive blocks. | Move nonvirtual blocks into the subsystem. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline `db_0143`: Similar block types on the model levels

## Check for unconnected ports and signal lines

Check whether model has unconnected input ports, output ports, or signal lines.

### Description

Unconnected inputs should be connected to ground blocks. Unconnected outputs should be connected to terminator blocks.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                  | Recommended Action                                                                             |
|--------------------------------------------|------------------------------------------------------------------------------------------------|
| Blocks have unconnected inputs or outputs. | Connect unconnected lines to blocks specified by the design or to Ground or Terminator blocks. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline db\_0081: Unconnected signals, block inputs and block outputs

## Check position of Trigger and Enable blocks

Check the position of Trigger and Enable blocks.

### Description

Locate blocks that define subsystems as conditional or iterative at the top of the subsystem diagram.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                          | Recommended Action                                                                        |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Trigger , Enable, and Action Port blocks are not centered in the upper third of the model diagram. | Move the Trigger, Enable, and Action Port blocks to the upper third of the model diagram. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline db\_0146: Triggered, enabled, conditional Subsystems



## Check usage of tunable parameters in blocks

Check whether tunable parameters specify expressions, data type conversions, or indexing operations.

### Description

To make a parameter tunable, you must enter the basic block without the use of MATLAB calculations or scripting. For example, omit:

- Expressions
- Data type conversions
- Selections of rows or columns

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                  | Recommended Action                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Blocks have a tunable parameter that specifies an expression, data type conversion, or indexing operation. | In each case, move the calculation outside of the block, for example, by performing the calculation with a series of Simulink blocks, or precompute the value as a new variable. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline db\_0110: Tunable parameters in basic blocks

## Check Stateflow data objects with local scope

Check whether Stateflow data objects with local scope are defined at the chart level or below.

### Description

You must define local data of a Stateflow block on the chart level or below in the object hierarchy. You cannot define local variables on the machine level; however, parameters and constants are allowed at the machine level.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                         | Recommended Action                             |
|-----------------------------------------------------------------------------------|------------------------------------------------|
| Local data is not defined in the Stateflow hierarchy at the chart level or below. | Define local data at the chart level or below. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline db\_0125: Scope of internal signals and local auxiliary variables

## Check for Strong Data Typing with Simulink I/O

Check whether labeled Stateflow and Simulink input and output signals are strongly typed.

### Description

Strong data typing between Stateflow and Simulink input and output signals is required.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                        | Recommended Action                                                                            |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| A Stateflow chart does not use strong data typing with Simulink. | Select the <b>Use Strong Data Typing with Simulink I/O</b> check box for the specified block. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline db\_0122: Stateflow and Simulink interface signals and parameters

## Check usage of exclusive and default states in state machines

Check states in state machines.

### Description

In state machines:

- There must be at least two exclusive states.
- A state cannot have only one substate.
- The initial state of a hierarchical level with exclusive states is clearly defined by a default transition.

Available with Simulink Verification and Validation.

### Prerequisite

A prerequisite MAAB guideline for this check is db\_0149: Flowchart patterns for condition actions.

### Results and Recommended Actions

| Condition                                    | Recommended Action                                                         |
|----------------------------------------------|----------------------------------------------------------------------------|
| A system is underspecified.                  | Validate that the intended design is represented in the Stateflow diagram. |
| Chart has only one exclusive (OR) state.     | Make the state a parallel state, or add another exclusive (OR) state.      |
| Chart does not have a default state defined. | Define a default state.                                                    |
| Chart has multiple default states defined.   | Define only one default state. Make the others nondefault.                 |
| State has only one exclusive (OR) substate.  | Make the state a parallel state, or add another exclusive (OR) state.      |

| <b>Condition</b>                                | <b>Recommended Action</b>                                     |
|-------------------------------------------------|---------------------------------------------------------------|
| State does not have a default substate defined. | Define a default substate.                                    |
| State has multiple default substates defined.   | Define only one default substate, make the others nondefault. |

### **Capabilities and Limitations**

- This check does not support charts that use MATLAB as the action language.
- You can run this check on your library models.

### **See Also**

MAAB guideline db\_0137: States in state machines

## Check Implement logic signals as Boolean data (vs. double)

Check the optimization parameter for Boolean data types.

### Description

Optimization for Boolean data types is required

Available with Simulink Verification and Validation.

### Prerequisite

A prerequisite MAAB guideline for this check is na\_0002: Appropriate implementation of fundamental logical and numerical operations.

### Results and Recommended Actions

| Condition                                                                                         | Recommended Action                                                                                                                                    |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configuration setting for <b>Implement logic signals as boolean data (vs. double)</b> is not set. | Select the <b>Implement logic signals as boolean data (vs. double)</b> check box in the Configuration Parameters dialog box <b>Optimization</b> pane. |

### See Also

MAAB guideline jc\_0011: Optimization parameters for Boolean data types

## Check model diagnostic parameters

Check the model diagnostics configuration parameter settings.

### Description

You should enable the following diagnostics:

**Algebraic loop**

**Minimize algebraic loop**

**Inf or NaN block output**

**Duplicate data store names**

**Unconnected block input ports**

**Unconnected block output ports**

**Unconnected line**

**Unspecified bus object at root Output block**

**Mux blocks used to create bus signals**

**Element name mismatch**

**Invalid function-call connection**

Diagnostics not listed in the Results and Recommended Actions section below can be set to any value.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                      | Recommended Action                                                                                                                                                                                                                                                     |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Algebraic loop</b> is set to none.          | Set <b>Algebraic loop</b> on the <b>Diagnostics &gt; Solver</b> pane of the Configuration Parameters dialog box to error or warning. Otherwise, Simulink might attempt to automatically break the algebraic loops, which can impact the execution order of the blocks. |
| <b>Minimize algebraic loop</b> is set to none. | Set <b>Minimize algebraic loop</b> on the <b>Diagnostics &gt; Solver</b> pane of the Configuration Parameters dialog box to error or warning. Otherwise, Simulink                                                                                                      |

| Condition                                                                                                                                                           | Recommended Action                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                     | might attempt to automatically break the algebraic loops for reference models and atomic subsystems, which can impact the execution order for those models or subsystems.                 |
| <p><b>Inf or NaN block output</b> is set to none, which can result in numerical exceptions in the generated code.</p>                                               | <p>Set <b>Inf or NaN block output</b> on the <b>Diagnostics &gt; Data Validity &gt; Signals</b> pane of the Configuration Parameters dialog box to error or warning.</p>                  |
| <p><b>Duplicate data store names</b> is set to none, which can result in nonunique variable naming in the generated code.</p>                                       | <p>Set <b>Duplicate data store names</b> on the <b>Diagnostics &gt; Data Validity &gt; Signals</b> pane of the Configuration Parameters dialog box to error or warning.</p>               |
| <p><b>Unconnected block input ports</b> is set to none, which prevents code generation.</p>                                                                         | <p>Set <b>Unconnected block input ports</b> on the <b>Diagnostics &gt; Data Validity &gt; Signals</b> pane of the Configuration Parameters dialog box to error or warning.</p>            |
| <p><b>Unconnected block output ports</b> is set to none, which can lead to dead code.</p>                                                                           | <p>Set <b>Unconnected block output ports</b> on the <b>Diagnostics &gt; Data Validity &gt; Signals</b> pane of the Configuration Parameters dialog box to error or warning.</p>           |
| <p><b>Unconnected line</b> is set to none, which prevents code generation.</p>                                                                                      | <p>Set <b>Unconnected line</b> on the <b>Diagnostics &gt; Connectivity &gt; Signals</b> pane of the Configuration Parameters dialog box to error or warning.</p>                          |
| <p><b>Unspecified bus object at root Output block</b> is set to none, which can lead to an unspecified interface if the model is referenced from another model.</p> | <p>Set <b>Unspecified bus object at root Output block</b> on the <b>Diagnostics &gt; Connectivity &gt; Buses</b> pane of the Configuration Parameters dialog box to error or warning.</p> |
| <p><b>Mux blocks used to create bus signals</b> is set to none, which can lead to an unintended bus being created in the model.</p>                                 | <p>Set <b>Mux blocks used to create bus signals</b> on the <b>Diagnostics &gt; Connectivity &gt; Buses</b> pane of the Configuration Parameters dialog box to error or warning.</p>       |



| <b>Condition</b>                                                                                                           | <b>Recommended Action</b>                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Element name mismatch</b> is set to none, which can lead to an unintended interface in the generated code.              | Set <b>Element name mismatch</b> on the <b>Diagnostics &gt; Connectivity &gt; Buses</b> pane of the Configuration Parameters dialog box to error or warning.                                                                                                       |
| <b>Invalid function-call connection</b> is set to none, which can lead to an error in the operation of the generated code. | Set <b>Invalid function-call connection</b> on the <b>Diagnostics &gt; Connectivity &gt; Function Calls</b> pane of the Configuration Parameters dialog box to error or warning, since this condition can lead to an error in the operation of the generated code. |

### See Also

MAAB guideline jc\_0021: Model diagnostic settings

## Check the display attributes of block names

Check the display attributes of subsystem and block names.

### Description

Subsystem and block names should be displayed when providing descriptive information. The names should not be displayed if the block function is known from its appearance.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                | Recommended Action                                                                                            |
|--------------------------|---------------------------------------------------------------------------------------------------------------|
| Name is obvious.         | Hide name by clearing <b>Diagram &gt; Format &gt; Show Block Name</b> .                                       |
| Name is not descriptive. | Modify name to be more descriptive or hide name by clearing <b>Diagram &gt; Format &gt; Show Block Name</b> . |
| Name is not displayed.   | Display name by selecting <b>Diagram &gt; Format &gt; Show Block Name</b> .                                   |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline jc\_0061: Display of block names

## Check display for port blocks

Check the **Icon display** setting for Inport and Outport blocks.

### Description

The **Icon display** setting is required.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                   | Recommended Action                                                                      |
|---------------------------------------------|-----------------------------------------------------------------------------------------|
| The <b>Icon display</b> setting is not set. | Set the <b>Icon display</b> to Port number for the specified Inport and Outport blocks. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline jc\_0081: Icon display for Port block

## Check subsystem names

Check whether subsystem block names include invalid characters.

### Description

The names of all subsystem blocks are checked for invalid characters.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                           | Recommended Action                                                                              |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------|
| The subsystem name contains illegal characters.     | Rename the subsystem. Allowed characters include a–z, A–Z, 0–9, underscore (_), and period (.). |
| The subsystem name starts with a number.            | Rename the subsystem.                                                                           |
| The subsystem name starts with an underscore ("_"). | Rename the subsystem.                                                                           |
| The subsystem name ends with an underscore ("_").   | Rename the subsystem.                                                                           |
| The subsystem name has consecutive underscores.     | Rename the subsystem.                                                                           |
| The subsystem name has blank spaces.                | Rename the subsystem.                                                                           |

### Capabilities and Limitations

- You can run this check on your library models.
- The check does not report invalid characters in subsystem names for:
  - Virtual subsystems
  - Atomic subsystems with **Function Packaging** set to **Inline**

**Tips**

Use underscores to separate parts of a subsystem name instead of spaces.

**See Also**

MAAB guideline jc\_0201: Usable characters for Subsystem names

## Check port block names

Check whether Inport and Outport block names include invalid characters.

### Description

The names of all Inport and Outport blocks are checked for invalid characters.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                       | Recommended Action                                                                          |
|-------------------------------------------------|---------------------------------------------------------------------------------------------|
| The block name contains illegal characters.     | Rename the block. Allowed characters include a–z, A–Z, 0–9, underscore (_), and period (.). |
| The block name starts with a number.            | Rename the block.                                                                           |
| The block name starts with an underscore ("_"). | Rename the block.                                                                           |
| The block name ends with an underscore ("_").   | Rename the block.                                                                           |
| The block name has consecutive underscores.     | Rename the block.                                                                           |
| The block name has blank spaces.                | Rename the block.                                                                           |

### Capabilities and Limitations

You can run this check on your library models.

### Tips

Use underscores to separate parts of a block name instead of spaces.

### See Also

MAAB guideline jc\_0211: Usable characters for Inport blocks and Outport blocks

## Check character usage in signal labels

Check whether signal line names include invalid characters.

### Description

The names of all signal lines are checked for invalid characters.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                             | Recommended Action                                                                                |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| The signal line name contains illegal characters.     | Rename the signal line. Allowed characters include a–z, A–Z, 0–9, underscore (_), and period (.). |
| The signal line name starts with a number.            | Rename the signal line.                                                                           |
| The signal line name starts with an underscore ("_"). | Rename the signal line.                                                                           |
| The signal line name ends with an underscore ("_").   | Rename the signal line.                                                                           |
| The signal line name has consecutive underscores.     | Rename the signal line.                                                                           |
| The signal line name has blank spaces.                | Rename the signal line.                                                                           |
| The signal line name has control characters.          | Rename the signal line.                                                                           |

### Capabilities and Limitations

You can run this check on your library models.

### Tips

Use underscores to separate parts of a signal line name instead of spaces.

**See Also**

MAAB guideline jc\_0221: Usable characters for signal line names



## Check character usage in block names

Check whether block names include invalid characters.

### Description

The block names are checked for invalid characters.

This guideline does not apply to subsystem blocks.

Available with Simulink Verification and Validation.

### Prerequisite

A prerequisite MAAB guideline for this check is jc\_0201: Usable characters for Subsystem names.

### Results and Recommended Actions

| Condition                                   | Recommended Action                                                                          |
|---------------------------------------------|---------------------------------------------------------------------------------------------|
| The block name contains illegal characters. | Rename the block. Allowed characters include a–z, A–Z, 0–9, underscore (_), and period (.). |
| The block name starts with a number.        | Rename the block.                                                                           |
| The block name has blank spaces.            | Rename the block.                                                                           |
| The block name has double byte characters.  | Rename the block.                                                                           |

### Capabilities and Limitations

You can run this check on your library models.

### Tips

Carriage returns are allowed in block names.

**See Also**

MAAB guideline jc\_0231: Usable characters for block names

## Check Trigger and Enable block names

Check Trigger and Enable block port names.

### Description

Block port names should match the name of the signal triggering the subsystem.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                     | Recommended Action                                  |
|-------------------------------------------------------------------------------|-----------------------------------------------------|
| Trigger block does not match the name of the signal to which it is connected. | Match Trigger block names to the connecting signal. |
| Enable block does not match the name of the signal to which it is connected.  | Match Enable block names to the connecting signal.  |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline jc\_0281: Naming of Trigger Port block and Enable Port block

## Check for Simulink diagrams using nonstandard display attributes

Check model appearance setting attributes.

### Description

Model appearance settings are required to conform to the guidelines when the model is released.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                  | Recommended Action                                                                       |
|--------------------------------------------|------------------------------------------------------------------------------------------|
| The toolbar is not visible.                | Select <b>View &gt; Toolbar</b> .                                                        |
| <b>Wide Nonscalar Lines</b> is cleared.    | Select <b>Display &gt; Signals &amp; Ports &gt; Wide Nonscalar Lines</b> .               |
| <b>Viewer Indicators</b> is cleared.       | Select <b>Display &gt; Signals &amp; Ports &gt; Viewer Indicators</b> .                  |
| <b>Testpoint Indicators</b> is cleared.    | Select <b>Display &gt; Signals &amp; Ports &gt; Testpoint &amp; Logging Indicators</b> . |
| <b>Port Data Types</b> is selected.        | Clear <b>Display &gt; Signals &amp; Ports &gt; Port Data Types</b> .                     |
| <b>Storage Class</b> is selected.          | Clear <b>Display &gt; Signals &amp; Ports &gt; Storage Class</b> .                       |
| <b>Signal Dimensions</b> is selected.      | Clear <b>Display &gt; Signals &amp; Ports &gt; Signal Dimensions</b> .                   |
| <b>Model Browser</b> is selected.          | Clear <b>View &gt; Model Browser &gt; Show Model Browser</b> .                           |
| <b>Sorted Execution Order</b> is selected. | Clear <b>Display &gt; Blocks &gt; Sorted Execution Order</b> .                           |
| <b>Model Block Version</b> is selected.    | Clear <b>Display &gt; Blocks &gt; Block Version for Referenced Models</b> .              |

| <b>Condition</b>                                                              | <b>Recommended Action</b>                                                                                                                                                                             |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model Block I/O Mismatch is selected.                                         | Clear <b>Display &gt; Blocks &gt; Block I/O Mismatch for Referenced Models</b> .                                                                                                                      |
| Library Links is set to <b>Disabled</b> , <b>User Defined</b> or <b>All</b> . | Select <b>Display &gt; Library Links &gt; None</b> .                                                                                                                                                  |
| <b>Linearization Indicators</b> is cleared.                                   | Select <b>Display &gt; Signals &amp; Ports &gt; Linearization Indicators</b> .                                                                                                                        |
| Block backgrounds are not white.                                              | Blocks should have black foregrounds with white backgrounds. Click the specified block and select <b>Format &gt; Foreground Color &gt; Black</b> and <b>Format &gt; Background Color &gt; White</b> . |
| Diagrams do not have white backgrounds.                                       | Select <b>Diagram &gt; Format &gt; Canvas Color &gt; White</b> .                                                                                                                                      |
| Diagrams do not have zoom factor set to 100%.                                 | Select <b>View &gt; Zoom &gt; Normal (100%)</b> .                                                                                                                                                     |

### Action Results

Clicking **Modify** updates the display attributes to conform to the guideline.

### See Also

MAAB guideline na\_0004: Simulink model appearance

## Check MATLAB code for global variables

Check for global variables in MATLAB code.

### Description

Verifies that global variables are not used in any of the following:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                                                   | Recommended Action                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Global variables are used in one or more of the following: <ul style="list-style-type: none"><li>• MATLAB code in MATLAB Function blocks</li><li>• MATLAB functions defined in Stateflow charts</li><li>• Called MATLAB functions</li></ul> | Replace global variables with signal lines, function arguments, or persistent data. |

### See Also

MAAB guideline na\_0024: Global Variables

## Check visibility of block port names

Check the visibility of port block names.

### Description

An organization applying the MAAB guidelines must select one of the following alternatives to enforce:

- The name of port blocks are not hidden.
- The name of port blocks must be hidden.

Available with Simulink Verification and Validation.

### Input Parameters

#### All Port names should be shown (Format/Show Name)

Select this check box if all ports should show the name, including subsystems.

### Results and Recommended Actions

| Condition                                                                                                             | Recommended Action                                                                          |
|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Blocks do not show their name and the <b>All Port names should be shown (Format/Show Name)</b> check box is selected. | Change the format of the specified blocks to show names according to the input requirement. |
| Blocks show their name and the <b>All Port names should be shown (Format/Show Name)</b> check box is cleared.         | Change the format of the specified blocks to hide names according to the input requirement. |
| Subsystem blocks do not show their port names.                                                                        | Set the subsystem parameter <b>Show port labels</b> to a value other than none.             |
| Subsystem blocks show their port names.                                                                               | Set the subsystem parameter <b>Show port labels</b> to none.                                |

### **Capabilities and Limitations**

- You can run this check on your library models.
- This check does not look in masked subsystems.

### **See Also**

MAAB guideline na\_0005: Port block name visibility in Simulink models



## Check orientation of Subsystem blocks

Check the orientation of subsystem blocks.

### Description

Subsystem inputs must be located on the left side of the block, and outputs must be located on the right side of the block.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                            | Recommended Action                                                                                                |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Subsystem blocks are not using the right orientation | Rotate the subsystem so that inputs are on the left side of block and outputs are on the right side of the block. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline jc\_0111: Direction of Subsystem

## Check usage of Relational Operator blocks

Check the position of Constant blocks used in Relational Operator blocks.

### Description

When the relational operator is used to compare a signal to a constant value, the constant input should be the second, lower input.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                   | Recommended Action                                  |
|-----------------------------------------------------------------------------|-----------------------------------------------------|
| Relational Operator blocks have a Constant block on the first, upper input. | Move the Constant block to the second, lower input. |

### Capabilities and Limitations

You can run this check on your library models.

### See Also

MAAB guideline jc\_0131: Use of Relational Operator block

## Check usage of Switch blocks

Check usage of Switch blocks.

### Description

This check verifies that the Switch block's control input (the second input) is a Boolean value and that the block is configured to pass the first input when the control input is nonzero.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                     | Recommended Action                                                                       |
|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| The Switch block's control input (second input) is not a Boolean value.                       | Change the data type of the control input to Boolean.                                    |
| The Switch block is not configured to pass the first input when the control input is nonzero. | Set the block parameter <b>Criteria for passing first input</b> to <code>u2 ~=0</code> . |

### See Also

- MAAB guideline jc\_0141: Use of the Switch block
- Switch block

## Check usage of buses and Mux blocks

Check usage of buses and Mux blocks.

### Description

This check verifies the usage of buses and Mux blocks.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                | Recommended Action                                                    |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| The individual scalar input signals for a Mux block do not have common functionality, data types, dimensions, and units. | Modify the scalar input signals such that the specifications match.   |
| The output of a Mux block is not a vector.                                                                               | Change the output of the Mux block to a vector.                       |
| All inputs to a Mux block are not scalars.                                                                               | Make sure that all input signals to Mux blocks are scalars.           |
| The input for a Bus Selector block is not a bus signal.                                                                  | Make sure that the input for all Bus Selector blocks is a bus signal. |

### See Also

- MAAB guideline na\_0010: Grouping data flows into signals
- “Composite Signals”

## Check for bitwise operations in Stateflow charts

Identify bitwise operators (&, |, and ^) in Stateflow charts. If you select **Enable C-bit operations** for a chart, only bitwise operators in expressions containing Boolean data types are reported. Otherwise, all bitwise operators are reported for the chart.

### Description

Do not use bitwise operators in Stateflow charts, unless you enable bitwise operations.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                       | Recommended Action                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stateflow charts with <b>Enable C-bit operations</b> selected use bitwise operators (&,  , and ^) in expressions containing Boolean data types. | Do not use Boolean data types in the specified expressions.                                                                                                                                                                                                                                                          |
| The Model Advisor could not determine the data types in expressions with bitwise operations.                                                    | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions.                                                                                                                                                                                                       |
| Stateflow charts with <b>Enable C-bit operations</b> cleared use bitwise operators (&,  , and ^).                                               | To fix this issue, do either of the following: <ul style="list-style-type: none"> <li>• Modify the expressions to replace bitwise operators.</li> <li>• If not using Boolean data types, consider enabling bitwise operations. In the Chart properties dialog box, select <b>Enable C-bit operations</b>.</li> </ul> |

### Capabilities and Limitations

This check does not support charts that use MATLAB as the action language.

### **See Also**

- MAAB guideline na\_0001: Bitwise Stateflow operators
- “Binary and Bitwise Operations” in the Stateflow documentation

## Check for comparison operations in Stateflow charts

Identify comparison operations with different data types in Stateflow objects.

### Description

Comparisons should be made between variables of the same data types.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                       | Recommended Action                                                                                             |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Comparison operations with different data types were found.                                     | Revisit the specified operations to avoid comparison operations with different data types.                     |
| The Model Advisor could not determine the data types in expressions with comparison operations. | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions. |

### Capabilities and Limitations

This check does not support charts that use MATLAB as the action language.

### See Also

MAAB guideline na\_0013: Comparison operation in Stateflow

## Check for unary minus operations on unsigned integers in Stateflow charts

Identify unary minus operations applied to unsigned integers in Stateflow objects.

### Description

Do not perform unary minus operations on unsigned integers in Stateflow objects.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                        | Recommended Action                                                                                             |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Unary minus operations are applied to unsigned integers in Stateflow objects.                    | Modify the specified objects to remove dependency on unary minus operations.                                   |
| The Model Advisor could not determine the data types in expressions with unary minus operations. | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions. |

### Capabilities and Limitations

This check does not support charts that use MATLAB as the action language.

### See Also

MAAB guideline jc\_0451: Use of unary minus on unsigned integers in Stateflow



## Check for equality operations between floating-point expressions in Stateflow charts

Identify equal to operations (==) in expressions where at least one side of the expression is a floating-point variable or constant.

### Description

Do not use equal to operations with floating-point data types. You can use equal to operations with integer data types.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                    | Recommended Action                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Expressions use equal to operations (==) where at least one side of the expression is a floating-point variable or constant. | Modify the specified expressions to avoid equal to operations between floating-point expressions. If an equal to operation is required, a margin of error should be defined and used in the operation. |
| The Model Advisor could not determine the data types in expressions with equality operations.                                | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions.                                                                                         |

### Capabilities and Limitations

This check does not support charts that use MATLAB as the action language.

### See Also

MAAB guideline jc\_0481: Use of hard equality comparisons for floating point numbers in Stateflow

## Check input and output settings of MATLAB Function blocks

Identify MATLAB Function blocks that have inputs, outputs or parameters with inherited complexity or data type properties.

### Description

The check identifies MATLAB Function blocks with inherited complexity or data type properties. A results table provides links to MATLAB Function blocks that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                         | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MATLAB Function blocks have inherited interfaces. | <p>Explicitly define complexity and data type properties for inports, outputs, and parameters of MATLAB Function block identified in the results.</p> <p>If applicable, using the “MATLAB Function Block Editor”, make the following modifications in the “Ports and Data Manager”:</p> <ul style="list-style-type: none"> <li>• Change <b>Complexity</b> from Inherited to On or Off.</li> <li>• Change <b>Type</b> from Inherit: Same as Simulink to an explicit type.</li> <li>• Change <b>Size</b> from 1 (Inherited) to an explicit size.</li> </ul> |

| <b>Condition</b> | <b>Recommended Action</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <p>In the results table, <b>Compiled Value</b> provides suggestions for the actual values after the model compiles. If a MATLAB Function block is defined within a library, explicitly define the interface in the library rather than in the referencing model. If your model has multiple instances of MATLAB Function blocks defined in a library block, and the instances have different interface properties, consider using multiple library blocks.</p> |

**See Also**

MAAB guideline na\_0034: MATLAB Function block input/output settings

## Check MATLAB Function block metrics

Display complexity and code metrics for MATLAB Function blocks and external MATLAB functions. Report metric violations.

### Description

This check provides complexity and code metrics for MATLAB Function blocks and external MATLAB functions. The check additionally reports metric violations.

A results table provides links to MATLAB Function blocks and external MATLAB functions that violate the complexity input parameters.

Available with Simulink Verification and Validation.

### Input Parameters

#### Maximum effective lines of code per function

Provide the maximum effective lines of code per function. Effective lines do not include empty lines, comment lines, or lines with a function end keyword.

#### Minimum density of comments

Provide minimum density of comments. Density is ratio of comment lines to total lines of code.

#### Maximum cyclomatic complexity per function

Provide maximum cyclomatic complexity per function. Cyclomatic complexity is the number of linearly independent paths through the source code.

## Results and Recommended Actions

| Condition                                                                                    | Recommended Action                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MATLAB Function blocks or external MATLAB functions violate the complexity input parameters. | For the MATLAB Function block or external MATLAB function: <ul style="list-style-type: none"> <li>• If effective lines of code is too high, further divide the MATLAB function.</li> <li>• If comment density is too low, add comment lines.</li> <li>• If cyclomatic complexity per function is too high, further divide the MATLAB function.</li> </ul> |

## Capabilities and Limitations

You can run this check on your library models.

## See Also

- na\_0016: Source lines of MATLAB Functions
- na\_0018: Number of nested if/else and case statement

## Check for mismatches between names of Stateflow ports and associated signals

Check for mismatches between Stateflow ports and associated signal names.

### Description

The name of Stateflow input and output should be the same as the corresponding signal.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                         | Recommended Action                                             |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------|
| Signals have names that differ from those of their corresponding Stateflow ports. | Change the names of either the signals or the Stateflow ports. |

### See Also

MAAB guideline db\_0123: Stateflow port names

## Check scope of From and Goto blocks

Check the scope of From and Goto blocks.

### Description

You can use global scope for controlling flow. However, From and Goto blocks must use local scope for signal flows.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                 | Recommended Action                                                                                                                               |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| From and Goto blocks are not configured with local scope. | <ul style="list-style-type: none"><li>• Make sure the ports are connected</li><li>• Change the scope of the specified blocks to local.</li></ul> |

### See Also

MAAB guideline na\_0011: Scope of Goto and From blocks

## Requirements Consistency Checks

| In this section...                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------|
| “Identify requirement links with missing documents” on page 3-197                                                     |
| “Identify requirement links that specify invalid locations within documents” on page 3-198                            |
| “Identify selection-based links having descriptions that do not match their requirements document text” on page 3-199 |
| “Identify requirement links with path type inconsistent with preferences” on page 3-201                               |



## Identify requirement links with missing documents

Verify that requirements link to existing documents.

### Description

You used the Requirements Management Interface (RMI) to associate a design requirements document with a part of your model design and the interface cannot find the specified document.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                          | Recommended Action                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| The requirements document associated with a part of your model design is not accessible at the specified location. | Open the Requirements dialog box and fix the path name of the requirements document or move the document to the specified location. |

### Tips

If your model has links to a DOORS requirements document, to run this check, the DOORS software must be open and you must be logged in.

### See Also

“Maintenance of Requirements Links”

## Identify requirement links that specify invalid locations within documents

Verify that requirements link to valid locations (e.g., bookmarks, line numbers, anchors) within documents.

### Description

You used the Requirements Management Interface (RMI) to associate a location in a design requirements document (a bookmark, line number, or anchor) with a part of your model design and the interface cannot find the specified location in the specified document.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                | Recommended Action                                                                                |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| The location in the requirements document associated with a part of your model design is not accessible. | Open the Requirements dialog box and fix the location reference within the requirements document. |

### Tips

If your model has links to a DOORS requirements document, to run this check, the DOORS software must be open and you must be logged in.

If your model has links to a Microsoft Word or Microsoft Excel document, to run this check, those applications must be closed on your computer.

### See Also

“Maintenance of Requirements Links”

## Identify selection-based links having descriptions that do not match their requirements document text

Verify that descriptions of selection-based links use the same text found in their requirements documents.

### Description

You used selection-based linking of the Requirements Management Interface (RMI) to label requirements in the model's **Requirements** menu with text that appears in the corresponding requirements document. This check helps you manage traceability by identifying requirement descriptions in the menu that are not synchronized with text in the documents.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                              | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Selection-based links have descriptions that differ from their corresponding selections in the requirements documents. | If the difference reflects a change in the requirements document, click <b>Update</b> in the Model Advisor results to replace the current description in the selection-based link with the text from the requirements document (the external description). Alternatively, you can right-click the object in the model window, select <b>Edit/Add Links</b> from the <b>Requirements</b> menu, and use the Requirements dialog box that appears to synchronize the text. |

### Tips

If your model has links to a DOORS requirements document, to run this check, the DOORS software must be open and you must be logged in.

If your model has links to a Microsoft Word or Microsoft Excel document, to run this check, those applications must be closed on your computer.

**See Also**

“Maintenance of Requirements Links”

## Identify requirement links with path type inconsistent with preferences

Check that requirement paths are of the type selected in the preferences.

### Description

You are using the Requirements Management Interface (RMI) and the paths specifying the location of your requirements documents differ from the file reference type set as your preference.

Available with Simulink Verification and Validation.

### Results and Recommended Actions

| Condition                                                                                                                                                                                                             | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The paths indicating the location of requirements documents use a file reference type that differs from the preference specified in the Requirements Settings dialog box, on the <b>Selection Linking</b> tab.</p> | <p>Change the preferred document file reference type or the specified paths by doing one of the following:</p> <ul style="list-style-type: none"> <li>• Click <b>Fix</b> to change the current path to the valid path.</li> <li>• In the model window, select <b>Analysis &gt; Requirements &gt; Settings</b>, select the <b>Selection Linking</b> tab, and change the value for the <b>Document file reference</b> option.</li> </ul> |

### Linux Check for Absolute Paths

On Linux® systems, this check is named **Identify requirement links with absolute path type**. The check reports warnings for requirements links that use an absolute path.

The recommended action is:

- 1 Right-click the model object and select **Requirements > Edit/Add Links**.

- 2** Modify the path in the Document field to use a path relative to the current working folder or the model location.

**See Also**

“Maintenance of Requirements Links”