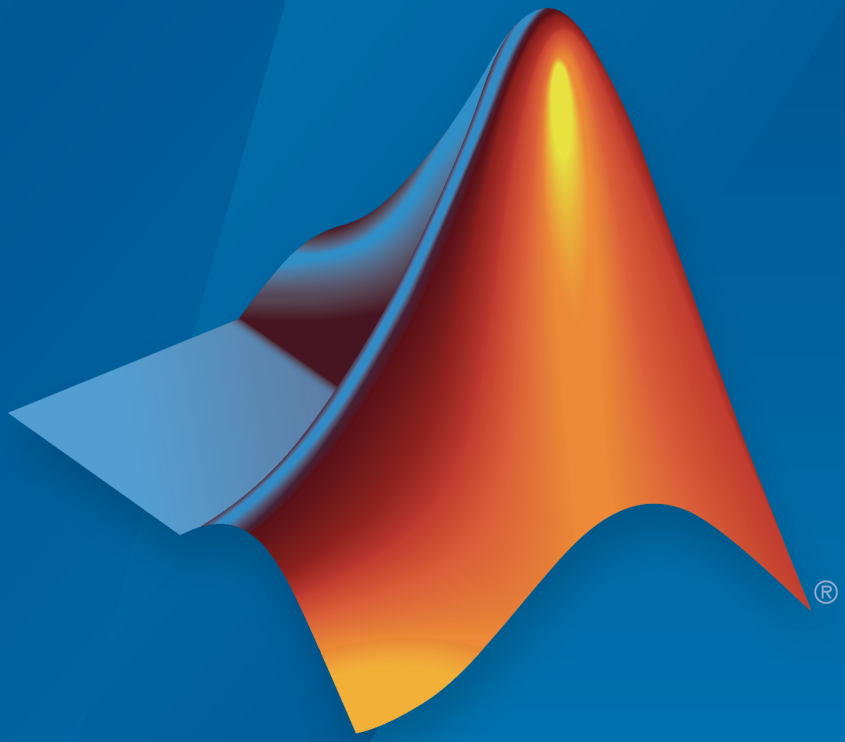
Simulink® Verification and Validation™

Reference



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Simulink® Verification and Validation™ Reference

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Functions — Alphabetical List

actionCallback

Class: Advisor.authoring.CustomCheck
Package: Advisor.authoring

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);

    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”

addCheck

Class: ModelAdvisor.FactoryGroup
Package: ModelAdvisor

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');
```

addGroup

Class: ModelAdvisor.Group
Package: ModelAdvisor

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');
```

To add `ModelAdvisor.Task` objects to a group using `addGroup`:

```
mdladvRoot = ModelAdvisor.Root();

% MAT1, MAT2, and MAT3 are registered ModelAdvisor.Task objects
% Create the group 'My Group'
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');
MAG.DisplayName='My Group';
```

```
% Add the first task to the 'My Group' folder
MAG.addTask(MAT1);

% Create a subfolder 'Folder1'
MAGSUB1 = ModelAdvisor.Group('com.mathworks.sample.Folder1');
MAGSUB1.DisplayName='Folder1';

% Add the second task to Folder1
MAGSUB1.addTask(MAT2);

% Create a subfolder 'Folder2'
MAGSUB2 = ModelAdvisor.Group('com.mathworks.sample.Folder2');
MAGSUB2.DisplayName='Folder2';

% Add the third task to Folder2
MAGSUB2.addTask(MAT3);

% Register the two subfolders. This must be done before calling addGroup
mdladvRoot.register(MAGSUB1);
mdladvRoot.register(MAGSUB2);

% Invoke addGroup to place the subfolders under 'My Group'
MAG.addGroup(MAGSUB1);
MAG.addGroup(MAGSUB2);

mdladvRoot.publish(MAG); % publish under Root
```

addItem

Class: ModelAdvisor.List
Package: ModelAdvisor

Add item to list

Syntax

`addItem(`*`element`*`)`

Description

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

Input Arguments

`element`

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.
- Character vector

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

- “Create Model Advisor Checks”

addItem

Class: ModelAdvisor.Paragraph
Package: ModelAdvisor

Add item to paragraph

Syntax

```
addItem(text, element)
```

Description

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

- Character vector
- 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

- "Create Model Advisor Checks"

addProcedure

Class: ModelAdvisor.Group
Package: ModelAdvisor

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);
```

addProcedure

Class: ModelAdvisor.Procedure
Package: ModelAdvisor

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);
```

addRow

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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 character vectors 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

- "Create Model Advisor Checks"
- "Format Check Results"

addTask

Class: ModelAdvisor.Group
Package: ModelAdvisor

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);
```

addTask

Class: ModelAdvisor.Procedure
Package: ModelAdvisor

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.Application class

Package: Advisor

Run Model Advisor across model hierarchy

Description

Use instances of `Advisor.Application` to run Model Advisor checks across a model hierarchy. You can use `Advisor.Application` to:

- Run checks on referenced models.
- Select model components for Model Advisor analysis.
- Select checks to run during Model Advisor analysis.

Consider using `Advisor.Application` if you have a large model with subsystems and model references. `Advisor.Application` does not run checks on library models. If you want to run checks on multiple independent models that are not in a model reference hierarchy or you want to leverage parallel processing, use `ModelAdvisor.run` to run Model Advisor checks on your model.

The `Advisor.Application` methods use the following definitions:

- *Model component* — Model in the system hierarchy. Models that the root model references and that `setAnalysisroot` specifies are model components.
- *Check instance* — Instantiation of a `ModelAdvisor.Check` object in the Model Advisor configuration. Each check instance has an instance ID. When you change the Model Advisor configuration, the instance ID can change.

Construction

To create an `Advisor.Application` object, use Advisor.Manager.createApplication.

Properties

`AnalysisRoot` — Name of root model in the model hierarchy to analyze

character vector

Name of root model in the model hierarchy to analyze, as specified by the `Advisor.Application.setAnalysisRoot` method. This property is read only.

`ID` — Unique identifier

character vector

Unique identifier for the `Advisor.Application` object. This property is read only.

`UseTempDir` — Run analysis in a temporary working folder

false (default) | true

Run analysis in a temporary working folder. Specified by the `Advisor.Manager.createApplication` method. This property is read only.

Data Types: `logical`

Methods

delete	Delete Advisor.Application object
deselectCheckInstances	Clear check instances from Model Advisor analysis
deselectComponents	Clear model components from Model Advisor analysis
generateReport	Generate report for Model Advisor analysis
getCheckInstanceIDs	Obtain check instance IDs
getResults	Access Model Advisor analysis results
loadConfiguration	Load Model Advisor configuration
run	Run Model Advisor analysis on model components
selectCheckInstances	Select check instances to use in Model Advisor analysis
selectComponents	Select model components for Model Advisor analysis
setAnalysisRoot	Specify model hierarchy for Model Advisor analysis

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects in the MATLAB® documentation.

Examples

Run Model Advisor Checks on Referenced Model

This example shows how to run a check on model `sldemo_mdlref_counter` referenced from `sldemo_mdlref_basic`.

1. In the Command Window, open model `sldemo_mdlref_basic` and referenced model `sldemo_mdlref_counter`.

```
open_system('sldemo_mdlref_basic');
open_system('sldemo_mdlref_counter');
```

2. Save a copy of the models to a work folder, renaming them to `mdlref_basic` and `mdlref_counter`.

```
save_system('sldemo_mdlref_basic','mdlref_basic');
save_system('sldemo_mdlref_counter','mdlref_counter');
```

3. In `mdlref_basic`, change model reference from `sldemo_mdlref_counter` to `mdlref_counter`. Save `mdlref_basic`.

```
set_param('mdlref_basic/CounterA','ModelName','mdlref_counter');
set_param('mdlref_basic/CounterB','ModelName','mdlref_counter');
set_param('mdlref_basic/CounterC','ModelName','mdlref_counter');
save_system('mdlref_basic');
```

4. Set root model to `mdlref_basic`.

```
RootModel='mdlref_basic';
```

5. Create an `Application` object.

```
app = Advisor.Manager.createApplication();
```

6. Set root analysis.

```
setAnalysisRoot(app,'Root',RootModel);
```

7. Clear all check instances from Model Advisor analysis.

```
deselectCheckInstances(app);
```

8 Select check **Identify unconnected lines, input ports, and output ports** using check instance ID.

```
instanceID = getCheckInstanceIDs(app,'mathworks.design.UnconnectedLinesPorts');
checkinstanceID = instanceID(1);
selectCheckInstances(app,'IDs',checkinstanceID);
```

9 Run Model Advisor analysis.

```
run(app);
```

10 Get analysis results.

```
getResults(app);
```

11 Generate and view the Model Advisor report. The Model Advisor runs the check on both `mdlref_basic` and `mdlref_counter`.

```
report = generateReport(app);
web(report)
```

12 Close the models.

```
close_system('mdlref_basic');
close_system('mdlref_counter');
```

Run Model Advisor Checks on a Subsystem

This example shows how to run a check on subsystem `CounterA` referenced from `sldemo_mdlref_basic`.

1 In the Command Window, open model `sldemo_mdlref_basic`.

```
open_system('sldemo_mdlref_basic');
```

2 Set root model to `sldemo_mdlref_basic`.

```
RootModel='sldemo_mdlref_basic';
```

3 Create an `Application` object.

```
app = Advisor.Manager.createApplication();
```

4 Set root analysis to subsystem `sldemo_mdlref_basic/CounterA`.

```
setAnalysisRoot(app,'Root','sldemo_mdlref_basic/CounterA','RootType','Subsystem');
```

5 Clear all check instances from Model Advisor analysis.

```
deselectCheckInstances(app);
```

6 Select check **Identify unconnected lines, input ports, and output ports** using check instance ID.

```
instanceID = getCheckInstanceIDs(app,'mathworks.design.UnconnectedLinesPorts');
checkinstanceID = instanceID(1);
selectCheckInstances(app,'IDs',checkinstanceID);
```

7 Run Model Advisor analysis.

```
run(app);
```

8 Get analysis results.

```
getResults(app);
```

9 Generate and view the Model Advisor report. The Model Advisor runs the check on subsystem `sldemo_mdlref_basic/CounterA`.

```
report = generateReport(app);
web(report)
```

10 Close the model.

```
close_system('sldemo_mdlref_basic');
```

More About

- Class Attributes
- Property Attributes

Introduced in R2015b

Advisor.authoring.generateConfigurationParameterDataFile

Package: Advisor.authoring

Generate XML data file for custom configuration parameter check

Syntax

```
Advisor.authoring.generateConfigurationParameterDataFile(dataFile,
source)
Advisor.authoring.generateConfigurationParameterDataFile(dataFile,
source,Name,Value)
```

Description

`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.

`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.

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>
```

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>
```

- “Create Check for Model Configuration Parameters”

Input Arguments

`dataFile` — Name of data file to create

character vector

Name of XML data file to create, specified as a character vector.

Example: `'myDataFile.xml'`

`source` — Name of model or configuration set

character vector | `Simulink.ConfigSet`

Name of model or `Simulink.ConfigSet` object used to specify configuration parameters

Example: 'vdp'

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`

More About

- "Data File for Configuration Parameter Check"

Introduced in R2014a

Advisor.authoring.CustomCheck class

Package: Advisor.authoring

Define custom check

Description

Instances of the `Advisor.authoring.CustomCheck` 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.

Methods

actionCallback	Register action callback for model configuration check
checkCallback	Register check callback for model configuration check

Copy Semantics

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

See Also

Advisor.authoring.DataFile |
`Advisor.authoring.generateConfigurationParameterDataFile`

How To

- "Create Check for Model Configuration Parameters"

Advisor.authoring.DataFile class

Package: Advisor.authoring

Interact with data file for model configuration checks

Description

The `Advisor.authoring.DataFile` class provides a container for a static method used when interacting with the data file for configuration parameter checks.

Methods

validate	Validate XML data file used for model configuration check

Copy Semantics

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

See Also

Advisor.authoring.CustomCheck | `Advisor.authoring.generateConfigurationParameterDataFile`

How To

- "Create Check for Model Configuration Parameters"

Advisor.Manager class

Package: Advisor

Manage applications

Description

The `Advisor.Manager` class defines application objects.

Methods

createApplication	Create `Advisor.Application` object
getApplication	Return handle to `Advisor.Application` object
refresh_customizations	Refresh Model Advisor check information cache

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects in the MATLAB documentation.

More About

- Class Attributes
- Property Attributes

Introduced in R2015b

allNames

Class: cv.cvdatagroup
Package: cv

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)
```

checkCallback

Class: Advisor.authoring.CustomCheck
Package: Advisor.authoring

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);

    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

Retrieve cyclomatic complexity coverage information from `cvdata` object

Syntax

```
complexity = complexityinfo(cvdo, object)
complexity = complexityinfo(cvdo, object, mode)
```

Description

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

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

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
`slObj`	Handle to a Simulink® API object

Object Specification	Description
`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
`{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}`	Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

When specifying an S-function block, valid values for `object` include the following:

Object Specification	Description
`{BlockPath, fName}`	Cell array with the path to an S-Function block and the name of a source file.
`{BlockHandle, fName}`	Cell array with an S-Function block handle and the name of a source file.
`{BlockPath, fName, funName}`	Cell array with the path to an S-Function block, the name of a source file, and a function name.
`{BlockHandle, fName, funName}`	Cell array with an S-Function block handle, the name of a source file an a function name.

For coverage data collected during Software-in-the-Loop (SIL) mode or Processor-in-the-Loop (PIL) simulation mode, valid values for `object` include the following:

Object Specification	Description
`{fileName, funName}`	Cell array with the name of a source file and a function name.
`{Model, fileName}`	Cell array with a model name (or model handle) and the name of a source file.
`{Model, fileName, funName}`	Cell array with a model name (or model handle), the name of a source file, and a function name.

`mode`

The `mode` argument specifies the simulation mode for coverage. Valid values for `mode` include the following:

Object Specification	Description
`'Normal'`	Model in Normal simulation mode.
`'SIL' (or 'PIL')`	Model in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefSIL' (or 'ModelRefPIL')`	Model reference in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefTopSIL' (or 'ModelRefTopPIL')`	Model reference in Software-in-the-Loop (SIL or Processor-in-the-Loop (PIL) simulation mode with code interface set to top model.

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]`:

`total_complexity`	Cyclomatic complexity coverage for `object` and its descendants (if any)
`local_complexity`	Cyclomatic complexity coverage for `object`

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 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** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. Under **Coverage metrics**, select **MCDC** as the structural coverage level.
5. Click **OK** to close the Configuration Parameters dialog box and save your changes.
6. Simulate the model and review the results in the HTML report.

More About

- "Cyclomatic Complexity"

See Also

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

Introduced in R2011a

conditioninfo

Retrieve condition coverage information from `cvdata` object

Syntax

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

`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
`slObj`	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}`	Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

When specifying an S-function block, valid values for `object` include the following:

Object Specification	Description
`{BlockPath, fName}`	Cell array with the path to an S-Function block and the name of a source file.
`{BlockHandle, fName}`	Cell array with an S-Function block handle and the name of a source file.
`{BlockPath, fName, funName}`	Cell array with the path to an S-Function block, the name of a source file, and a function name.
`{BlockHandle, fName, funName}`	Cell array with an S-Function block handle, the name of a source file an a function name.

For coverage data collected during Software-in-the-Loop (SIL) mode or Processor-in-the-Loop (PIL) simulation mode, valid values for `object` include the following:

Object Specification	Description
`{fileName, funName}`	Cell array with the name of a source file and a function name.
`{Model, fileName}`	Cell array with a model name (or model handle) and the name of a source file.

Object Specification	Description
`{Model, fileName, funName}`	Cell array with a model name (or model handle), the name of a source file, and a function name.

`mode`

The `mode` argument specifies the simulation mode for coverage. Valid values for `mode` include the following:

Object Specification	Description
`'Normal'`	Model in Normal simulation mode.
`'SIL' (or 'PIL')`	Model in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefSIL' (or 'ModelRefPIL')`	Model reference in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefTopSIL' (or 'ModelRefTopPIL')`	Model reference in Software-in-the-Loop (SIL or Processor-in-the-Loop (PIL) simulation mode with code interface set to top model.

`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:

`covered_outcomes`	Number of condition outcomes satisfied for `object`
`total_outcomes`	Total number of condition outcomes for `object`

`description`

A structure array with the following fields:

`text`	Character vector describing a condition or the block port to which it applies
`trueCnts`	Number of times the condition was true in a simulation
`falseCnts`	Number of times the condition was false in a simulation

Examples

The following example opens the `slvnvdemo_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 = 'slvnvdemo_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 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** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. Under **Coverage metrics**, select **Condition** as the structural coverage level.
5. On the **Coverage** > **Results** pane, specify the output you need.

6 Click **OK** to close the Configuration Parameters dialog box and save your changes.

7 Simulate the model and review the results.

More About

- "Condition Coverage (CC)"

See Also

`complexityinfo` | `cvsim` | `decisioninfo` | `getCoverageInfo` | `mcdcinfo` | `overflowsaturationinfo` | `sigrangeinfo` | `sigsizeinfo` | `tableinfo`

Introduced in R2006b

createApplication

Class: Advisor.Manager
Package: Advisor

Create `Advisor.Application` object

Syntax

```
app = Advisor.Manager.createApplication()
app = Advisor.Manager.createApplication(Name,Value)
```

Description

`app = Advisor.Manager.createApplication()` constructs an `Advisor.Application` object.

`app = Advisor.Manager.createApplication(Name,Value)` constructs an `Advisor.Application` object that operates in a temporary working folder.

Input Arguments

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: `'UseTempDir',true` specifies that `Advisor.Application` object operates in a temporary working folder.

`'UseTempDir'` — Create `Advisor.Application` object that operates in a temporary working folder
false (default) | true

Data Types: `logical`

Output Arguments

app — Application

`Advisor.Application` object

Constructed `Advisor.Application` object.

See Also

Advisor.Application | Advisor.Manager.getApplication

Introduced in R2015b

cv.cvdatagroup class

Package: cv

Collection of `cvdata` objects

Description

Instances of this class contain a collection of `cvdata` objects. Each `cvdata` object contains coverage results for a particular model in the model hierarchy.

Construction

cv.cvdatagroup	Create collection of `cvdata` objects for model reference hierarchy

Methods

allNames	Get names of all models associated with `cvdata` objects in `cv.cvdatagroup`
get	Get `cvdata` object
getAll	Get all `cvdata` objects

Properties

name	`cv.cvdatagroup` object name

Copy Semantics

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

cv.cvdatagroup

Class: cv.cvdatagroup
Package: cv

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

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.

Introduced in R2006b

cvhtml

Produce HTML report from model coverage objects

Syntax

```
cvhtml(file, cvdo)
cvhtml(file, cvdo1, cvdo2, ...)
cvhtml(file, cvdo1, cvdo2, ..., options)
```

Description

`cvhtml(file, cvdo)` creates an HTML report of the coverage results in the `cvdata` or `cv.cvdatagroup` object `cvdo` when you run model coverage in simulation. `cvhtml` saves the coverage results in `file`. The model must be open when you use `cvhtml` to generate its coverage report.

`cvhtml(file, cvdo1, cvdo2, ...)` creates a combined report of several `cvdata` objects. The results from each object appear in a separate column of the HTML report. Each `cvdata` object must correspond to the same root model or subsystem. Otherwise, the function fails.

`cvhtml(file, cvdo1, cvdo2, ..., options)` creates a combined report of several `cvdata` objects using the report options specified by `options`.

Input Arguments

`cvdo`

A `cv.cvdatagroup` object

`file`

Character vector 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` character vector separated by commas or spaces (e.g., `'-hTR=1 -bRG=0 -scm=0'`).

Option	Description	Default
`-sRT`	Show report	`on`
`-sVT`	Web view mode	`off`
`-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 `slvnvdemo_cv_small_controller` mode and save it as `ratelim_coverage.html`:

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

Alternatives

Use the coverage settings 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** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. On the **Coverage > Results** pane, select **Generate report automatically after analysis**.
5. Click **OK** to close the Configuration Parameters dialog box and save your changes.
6. Simulate the model and review the generated report.

More About

- "Create HTML Reports with cvhtml"

See Also

`cv.cvdatagroup` | `cvsim` | `cvmodelview`

Introduced before R2006a

cvload

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);
```

More About

- “Load Stored Coverage Test Results with cvload”

See Also

cvsave

Introduced before R2006a

cvmodelview

Display model coverage results with model coloring

Syntax

```
cvmodelview(cvdo)
```

Description

`cvmodelview(cvdo)` displays coverage results from the `cvdata` object `cvdo` by coloring the objects in the model that have model coverage results.

Examples

Open the `slvnvdemo_cv_small_controller` example model, create the test specification object `testObj`, and execute `testObj` to collect model coverage. Run `cvmodelview` to color the model objects for which you collect model coverage information:

```
mdl = 'slvnvdemo_cv_small_controller';
open_system(mdl)
testObj = cvtest(mdl)
data = cvsim(testObj)
cvmodelview(data)
```

Alternatives

Use the coverage settings to display model coverage results by coloring objects:

1. Open the model.
2. Select **Analysis** > **Coverage** > **Settings**.
3. On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.

4 On the **Coverage > Results** pane, select **Display coverage results using model coloring**.

5 Click **OK** to close the Configuration Parameters dialog box and save your changes.

6 Simulate the model and review the results.

More About

- "View Coverage Results in a Model"

See Also

`cvhtml` | `cvsim`

Introduced in R2006b

cvresults

Returns active coverage data, clears and loads active coverage data from a file

Syntax

```
[CVDATA, CVCUMDATA] = cvresults(MODELNAME)
[cvresults(MODELNAME, 'clear')
cvresults(MODELNAME, 'load', filename)
```

Description

`[CVDATA, CVCUMDATA] = cvresults(MODELNAME)` returns the active single-run coverage data `CVDATA` and cumulative coverage data `CVCUMDATA`.

`[cvresults(MODELNAME, 'clear')` clears the active coverage data.

`cvresults(MODELNAME, 'load', filename)` loads the active coverage data from a `.cvt` file.

Introduced in R2016a

cvsave

Save coverage tests and results to file

Syntax

```
cvsave(filename, model)
cvsave(filename, cvd)
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, cvd)` saves all the results (`cvdata` objects) for the active model in the text file `filename.cvt`. `cvsave` also saves information about any referenced models.

`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`

Character vector containing the name of the file in which to save the data. `cvsave` appends the extension `.cvt` to the name of the file when saving it.

`model`

Handle to a Simulink model

`cvd`

`cvdata` object

`cvto`

`cvtest` object

`cell_array`

Cell array of `cvtest` objects

Examples

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

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

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

```
% 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]);

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 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** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. On the **Coverage > Results** pane, select **Save last run in workspace variable**.
5. Click **OK** to close the Configuration Parameters dialog box and save your changes.
6. Simulate the model and review the results.

More About

- "Save Test Runs to File with cvsave"

See Also

`cvload`

Introduced before R2006a

cvsim

Simulate and return model coverage results for test objects

Syntax

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

Description

`cvdo = cvsim(modelName)` simulates the model and returns the coverage results for the model. `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.cvdatagroup` object.

`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.cvdatagroup` 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 class` 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,...] = 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

`modelName`

Name of model specified as a character vector

`cvto`

`cvtest` object that specifies coverage options for the simulation

`ParameterStruct`

Model parameters specified as a structure

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 class` 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.AbsTol            = '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.cvdatagroup` | `cvtest` | `sim`

Introduced before R2006a

cvtest

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.

Field	Description
`id`	Read-only internal ID
`modelcov`	Read-only internal ID
`rootPath`	Name of system or subsystem for analysis
`label`	String used when reporting results
`setupCmd`	Command executed in base workspace prior to simulation
`settings.condition`	Set to `1` for condition coverage.
`settings.decision`	Set to `1` for decision coverage.
`settings.designverifier`	Set to `1` for coverage for Simulink Design Verifier™ blocks.
`settings.mcdc`	Set to `1` for MCDC coverage.
`settings.relationalop`	Set to `1` for relational boundary coverage. Use `options.covBoundaryAbsTol` and `options.covBoundaryRelTol` for specifying tolerances for this coverage. For more information, see "Relational Boundary Coverage".
`settings.sigrange`	Set to `1` for signal range coverage.
`settings.sigsize`	Set to `1` for signal size coverage.
`settings.tableExec`	Set to `1` for lookup table coverage.
`modelRefSettings.enable`	• `'off'` — Disables coverage for all referenced models. • `'all'` or `on` — Enables coverage for all referenced models.

Field	Description
	• `'filtered'` — Enables coverage only for referenced models not listed in the `excludedModels` subfield.
`modelRefSettings.excludeTopModel`	Set to `1` to exclude coverage for the top model
`modelRefSettings.excludedModels`	Character vector specifying a comma-separated list of referenced models for which coverage is disabled.
`emlSettings.enableExternal`	Set to `1` to enable coverage for external program files called by MATLAB functions in your model.
`sfcnSettings.enableSfcn`	Set to `1` to enable coverage for C/C++ `S-Function` blocks in your model.
`options.forceBlockReduction`	Set to `1` to override the Simulink **Block reduction** parameter if it is enabled.
`options.covBoundaryRelTol`	Set to the value of relative tolerance for relational boundary coverage. For more information, see “Relational Boundary Coverage”.
`options.covBoundaryAbsTol`	Set to the value of absolute tolerance for relational boundary coverage. For more information, see “Relational Boundary Coverage”.
`options.useTimeInterval`	Set to `1` to restrict model coverage recording only inside a specified simulation time interval. For more information see “Specify Model Coverage Options”.
`options.intervalStartTime`	Value of the coverage recording interval start time.
`options.intervalStopTime`	Value of the coverage recording interval stop time.
`filter.fileName`	Character vector 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 `slvnvdemo_ratelim_harness` model. Simulate and get coverage data using `cvsim`.

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

More About

- "Create Tests with cvtest"

See Also

`cvsim` | `cv.cvdatagroup`

Introduced before R2006a

decisioninfo

Retrieve decision coverage information from `cvdata` object

Syntax

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

`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
`slObj`	Handle to a Simulink 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
`{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}`	Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

When specifying an S-function block, valid values for `object` include the following:

Object Specification	Description
`{BlockPath, fName}`	Cell array with the path to an S-Function block and the name of a source file.
`{BlockHandle, fName}`	Cell array with an S-Function block handle and the name of a source file.
`{BlockPath, fName, funName}`	Cell array with the path to an S-Function block, the name of a source file, and a function name.
`{BlockHandle, fName, funName}`	Cell array with an S-Function block handle, the name of a source file an a function name.

For coverage data collected during Software-in-the-Loop (SIL) mode or Processor-in-the-Loop (PIL) simulation mode, valid values for `object` include the following:

Object Specification	Description
`{fileName, funName}`	Cell array with the name of a source file and a function name.

Object Specification	Description
`{Model, fileName}`	Cell array with a model name (or model handle) and the name of a source file.
`{Model, fileName, funName}`	Cell array with a model name (or model handle), the name of a source file, and a function name.

`mode`

The `mode` argument specifies the simulation mode for coverage. Valid values for `mode` include the following:

Object Specification	Description
`'Normal'`	Model in Normal simulation mode.
`'SIL' (or 'PIL')`	Model in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefSIL' (or 'ModelRefPIL')`	Model reference in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefTopSIL' (or 'ModelRefTopPIL')`	Model reference in Software-in-the-Loop (SIL or Processor-in-the-Loop (PIL) simulation mode with code interface set to top model.

`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:

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

Examples

Open the `slvnvdemo_cv_small_controller` model and create the test specification object `testObj`. Enable decision coverage for `slvnvdemo_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 = 'slvnvdemo_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 to collect and display decision coverage results:

1. Open the model.
2. In the Model Editor, select **Analysis** > **Coverage** > **Settings**.
3. On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. Under **Coverage metrics**, select **Decision** as the structural coverage level.

5 On the **Coverage** > **Results**pane, specify the output you need.

6 Click **OK** to close the Configuration Parameters dialog box and save your changes.

7 Simulate the model and review the results.

More About

- "Decision Coverage (DC)"

See Also

`complexityinfo` | `cvsim` | `conditioninfo` | `getCoverageInfo` | `mcdcinfo` | `overflowsaturationinfo` | `sigrangeinfo` | `sigsizeinfo` | `tableinfo`

Introduced in R2006b

executioninfo

Retrieve execution coverage information from `cvdata` object

Syntax

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

Description

`coverage = executioninfo(cvdo, object)` returns execution coverage results from the `cvdata` object `cvdo` for the model component specified by `object`.

`coverage = executioninfo(cvdo, object, mode)` returns execution coverage results from the `cvdata` object `cvdo` for the model component specified by `object` for the simulation mode `mode`.

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

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

Input Arguments

`cvdo`

`cvdata` object

`object`

The `object` argument specifies an object in the model or Stateflow chart that received execution 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
`slObj`	Handle to a Simulink 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
`{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}`	Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

When specifying an S-function block, valid values for `object` include the following:

Object Specification	Description
`{BlockPath, fName}`	Cell array with the path to an S-Function block and the name of a source file.
`{BlockHandle, fName}`	Cell array with an S-Function block handle and the name of a source file.
`{BlockPath, fName, funName}`	Cell array with the path to an S-Function block, the name of a source file, and a function name.
`{BlockHandle, fName, funName}`	Cell array with an S-Function block handle, the name of a source file an a function name.

For coverage data collected during Software-in-the-Loop (SIL) mode or Processor-in-the-Loop (PIL) simulation mode, valid values for `object` include the following:

Object Specification	Description
`{fileName, funName}`	Cell array with the name of a source file and a function name.

Object Specification	Description
`{Model, fileName}`	Cell array with a model name (or model handle) and the name of a source file.
`{Model, fileName, funName}`	Cell array with a model name (or model handle), the name of a source file, and a function name.

`mode`

The `mode` argument specifies the simulation mode for coverage. Valid values for `mode` include the following:

Object Specification	Description
`'Normal'`	Model in Normal simulation mode.
`'SIL' (or 'PIL')`	Model in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefSIL' (or 'ModelRefPIL')`	Model reference in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefTopSIL' (or 'ModelRefTopPIL')`	Model reference in Software-in-the-Loop (SIL or Processor-in-the-Loop (PIL) simulation mode with code interface set to top model.

`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 execution coverage results for `object`. The two elements are:

`covered_outcomes`	Number of execution outcomes satisfied for `object`

`total_outcomes`	Number of execution outcomes for `object`

`description`

`description` is a structure array containing textual descriptions of each decision and descriptions and execution counts for each outcome within `object`.

Examples

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

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

Alternatives

Use the coverage settings to collect and display execution coverage results:

1. Open the model.
2. In the Model Editor, select **Analysis** > **Coverage** > **Settings**.
3. On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. Under **Coverage metrics**, select **Block Execution** as the structural coverage level.
5. On the **Coverage** > **Results**pane, specify the output you need.
6. Click **OK** to close the Configuration Parameters dialog box and save your changes.
7. Simulate the model and review the results.

More About

- “Execution Coverage (EC)”

See Also

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

Introduced in R2006b

delete

Class: Advisor.Application
Package: Advisor

Delete Advisor.Application object

Syntax

```
delete(app)
```

Description

`delete(app)` deletes the `Application` object when you close the root model specified using `Advisor.Application.setAnalysisRoot`, `Application` objects are implicitly closed.

Examples

```
app = Advisor.Manager.createApplication();
delete(app)
```

Input Arguments

`app` — `Advisor.Application` object to destroy

handle

`Advisor.Application` object to destroy, as specified by `Advisor.Manager.createApplication`.

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot

Introduced in R2015b

deselectCheckInstances

Class: Advisor.Application
Package: Advisor

Clear check instances from Model Advisor analysis

Syntax

```
deselectCheckInstances(app)
deselectCheckInstances(app,Name,Value)
```

Description

You can clear check instances from Model Advisor analysis. A check instance is an instantiation of a `ModelAdvisor.Check` object in the Model Advisor configuration. When you change the Model Advisor configuration, the check instance ID might change. To obtain the check instance ID, use the `getCheckInstanceIDs` method.

`deselectCheckInstances(app)` clears all check instances from Model Advisor analysis.

`deselectCheckInstances(app,Name,Value)` clears check instances specified by `Name,Value` pair arguments from Model Advisor analysis.

Input Arguments

app — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

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`.

`'IDs'` — Checks instance IDs
cell array

Check instances to clear from Model Advisor analysis, as specified by a cell array of IDs

Data Types: `cell`

Examples

Clear All Check Instances from Model Advisor Analysis

This example shows how to set the root model, create an `Application` object, set root analysis, and clear checks instances from Model Advisor analysis.

```
% Set root model to sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Deselect all checks
deselectCheckInstances(app);
```

Clear Check Instance from Model Advisor Analysis Using Instance ID

This example shows how to set the root model, create an `Application` object, set root analysis, and deselect checks instances using instance IDs.

```
% Set root model to sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);
```

```
% Deselect "Identify unconnected lines, input ports, and output
% ports" check using instance ID
instanceID = getCheckInstanceIDs(app,'mathworks.design.UnconnectedLinesPorts');
checkinstanceID = instanceID(1);
deselectCheckInstances(app,'IDs',checkinstanceID);
```

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot | Advisor.Application.getCheckInstanceIDs | Advisor.Application.selectCheckInstances

Introduced in R2015b

deselectComponents

Class: Advisor.Application
Package: Advisor

Clear model components from Model Advisor analysis

Syntax

```
deselectComponents(app)
deselectComponents(app,Name,Value)
```

Description

You can clear model components from Model Advisor analysis. A model component is a model in the system hierarchy. Models that the root model references and that `Advisor.Application.setAnalysisRoot` specifies are model components.

`deselectComponents(app)` clears all components from Model Advisor analysis.

`deselectComponents(app,Name,Value)` clears model components specified by `Name,Value` pair arguments from Model Advisor analysis.

Input Arguments

app — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

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`.

`'IDs'` — Component IDs
cell array

Components to clear from Model Advisor analysis, as specified by a cell array of IDs

Data Types: `cell`

`'HierarchicalSelection'` — Clear component and component children
false (default) | true

Clear components specified by IDs and component children from Model Advisor analysis

Data Types: `logical`

Examples

Clear All Components from Model Advisor Analysis

This example shows how to set the root model, create an `Application` object, set root analysis, and clear all components from Model Advisor analysis.

```
% Set root model to  sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Deselect all components
deselectComponents(app);
```

Clear Components from Model Advisor Analysis Using IDs

This example shows how to set the root model, create an `Application` object, set root analysis, and clear model components using IDs.

```
% Set root model to  sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();
```

```
% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Deselect component using IDs
deselectComponents(app,'IDs',RootModel);
```

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot | Advisor.Application.selectComponents

Introduced in R2015b

generateReport

Class: Advisor.Application
Package: Advisor

Generate report for Model Advisor analysis

Syntax

```
generateReport(app)
generateReport(app,Name,Value)
```

Description

Generate a Model Advisor report for an `Application` object analysis.

`generateReport(app)` generates a Model Advisor report for each component specified by the `Application` object. By default, a report with the name of the analysis root is generated in the current folder.

`generateReport(app,Name,Value)` generates a Model Advisor report for each component specified by the `Application` object. Use the `Name,Value` pairs to specify the location and name of the report.

Input Arguments

app — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

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`.

`'Location'` — Path to report location
character vector

`'Name'` — Report name
character vector

Examples

Generate Report

This example shows how to generate a report with the analysis root name in the current folder.

```
% Set root model to  sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Run Model Advisor analysis
run(app);

% Generate report
report = generateReport(app);

% Open the report in web browser
web(report);
```

Generate Report with Specified Name and Location

This example shows how to generate a report with a specified name and location.

```
% Set root model to  sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
```

```
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Run Model Advisor analysis
run(app);

% Generate report in my_work directory
mkdir my_work
report = generateReport(app,'Location','my_work','Name','RootModelReport');

%Open the report in web browser
web(report);
```

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot | Advisor.Application.run

Introduced in R2015b

get

Class: cv.cvdatagroup
Package: cv

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, 'slvnvdemo_cv_small_controller');
```

getAll

Class: cv.cvdatagroup
Package: cv

Get all `cvdata` objects

Syntax

```
getAll(cvdo)
```

Description

`getAll(cvdo)` returns all `cvdata` objects in the `cv.cvdatagroup` object `cvdo`.

Examples

Return all `cvdata` objects from the specified Simulink model:

```
getAll(cvdg, 'slvnvdemo_cv_small_controller');
```

getApplication

Class: Advisor.Manager
Package: Advisor

Return handle to `Advisor.Application` object

Syntax

```
app = getApplication(Name,Value)
```

Description

`app = getApplication(Name,Value)` returns the handle to an `Advisor.Application` object by using the object properties.

Input Arguments

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: `'Id',appID` returns handle to an `Advisor.Application` using the object ID.

`'Id'` — `Advisor.Application` object ID
`Advisor.Application` object

Data Types: `function_handle`

`'Root'` — Root model name
character vector

Data Types: `char`

`'RootType'` — Type of root analysis

`'Model'` (default) | `'Subsystem'`

Data Types: `char`

Output Arguments

`app` — Handle to `Advisor.Application` object

`Advisor.Application` object

Data Types: `function_handle`

See Also

Advisor.Application | Advisor.Manager.createApplication

Introduced in R2015b

getCheckInstanceIDs

Class: Advisor.Application
Package: Advisor

Obtain check instance IDs

Syntax

```
CheckInstanceIDs = getCheckInstanceIDs(app)
CheckInstanceIDs = getCheckInstanceIDs(app,CheckID)
```

Description

Obtain the check instance ID for a check using the check ID. A check instance is an instantiation of a `ModelAdvisor.Check` object in the Model Advisor configuration. When you change the Model Advisor configuration, the check instance ID might change. The check ID is a static identifier that does not change.

`CheckInstanceIDs = getCheckInstanceIDs(app)` returns a cell array of IDs.

`CheckInstanceIDs = getCheckInstanceIDs(app,CheckID)` returns a instance ID for a check.

Input Arguments

app — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

CheckID — Check ID associated with Model Advisor check

character vector

Check ID associated with Model Advisor check.

Example: `'mathworks.design.UnconnectedLinesPorts'`

Output Arguments

`CheckInstanceIDs` — Cell array of check instance IDs

cell array

Check instance IDs, returned as a cell array of IDs

Examples

Obtain Check Instance IDs

This example shows how to set the root model, create an `Application` object, set root analysis, and obtain the check instance ID.

```
% Set root model to sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Select all check instances
selectCheckInstances(app);

% Obtain check instance IDs
CheckInstanceIDs = getCheckInstanceIDs(app);
```

Obtain Check Instance ID for a Check

This example shows how to set the root model, create an `Application` object, set root analysis, and obtain the check instance ID for check **Identify unconnected lines, input ports**.

```
% Set root model to sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
```

```
setAnalysisRoot(app,'Root',RootModel);

% Select all check instances
selectCheckInstances(app);

%  Obtain check instance ID for Model Advisor check "Identify unconnected lines,
%   input ports"
CheckInstanceIDs = getCheckInstanceIDs(app,'mathworks.design.UnconnectedLinesPorts');
```

Alternatives

In the left-hand pane of the Model Advisor window, right-click the check and select **Send Check Instance ID to Workspace**.

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot | Advisor.Application.selectCheckInstances

Introduced in R2015b

getCoverageInfo

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
`slObj`	Handle to a Simulink API object
`sfID`	Stateflow ID from a singly instantiated Stateflow chart
`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
`{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}`	Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

Default:

`metric`

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

`test`	`Test Objective` block
`proof`	`Proof Objective` block
`condition`	`Test Condition` block
`assumption`	`Proof Assumption` block

`ignore_descendants`

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

Output Arguments

`coverage`

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

covered_outcomes	Number of test objectives satisfied for `object`
total_outcomes	Total number of test objectives for `object`

`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 = cvsim(testObj)
blk_handle = get_param([mdl, '/True'], 'Handle');
getCoverageInfo(data, blk_handle)
```

Alternatives

Use the coverage settings 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** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. Under **Coverage metrics**, select **Objectives and constraints**.
5. Click **OK** to close the Configuration Parameters dialog box and save your changes.
6. Simulate the model and review the results.

More About

- "Simulink Design Verifier Coverage"

See Also

`complexityinfo` | `cvsim` | `conditioninfo` | `decisioninfo` | `mcdcinfo` | `overflowsaturationinfo` | `sigrangeinfo` | `sigsizeinfo` | `tableinfo`

Introduced in R2009b

getEntry

Class: ModelAdvisor.Table
Package: ModelAdvisor

Get table cell contents

Syntax

```
content = getEntry(table, row, column)
```

Description

`content = getEntry(table, row, column)` gets the contents of the specified cell.

Input Arguments

`table`	Instantiation of the `ModelAdvisor.Table` class
`row`	An integer specifying the row
`column`	An integer specifying the column

Output Arguments

`content`	An element object or object array specifying the content of the table entry

Examples

Get the content of the table cell in the third column, third row:

```
table1 = ModelAdvisor.Table(4, 4);
```

```
.
.
.
content = getEntry(table1, 3, 3);
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

getID

Class: ModelAdvisor.Check
Package: ModelAdvisor

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 identifier for 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"
- "Create Model Advisor Checks"

execute

Class: slmetric.Engine
Package: slmetric

Generate metric data

Syntax

```
execute(slmetric_obj)
execute(slmetric_obj,MetricIDs)
```

Description

Generate model metric data for the specified metric engine object. Subsequent calls to this method do not generate metric data unless the model or the metric algorithm `Version` property has changed.

To generate metric data for all available metrics, use `execute(slmetric_obj)` .

To generate metric data for specific metrics, use `execute(slmetric_obj,MetricIDs)` .

Input Arguments

`slmetric_obj` — Metric engine object

`slmetric.Engine` object

Constructed `slmetric.Engine` object.

`MetricIDs` — Metric identifier

character vector | cell array of character vectors

Metric identifier, specified as a character vector or a cell array of character vectors.

Example: `'mathworks.metrics.DescriptiveBlockNames'`

Examples

Generate Metrics

This example shows how to create a `slmetric.Engine` object, set the analysis root, generate metrics, and collect metrics for model `vdp`.

```
% Create an slmetric.Engine object
slmetric_obj = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(slmetric_obj,'Root','vdp','RootType','Model');

% Generate and collect model metrics
execute(slmetric_obj);
rc = getMetrics(slmetric_obj);

% Generate and collect model metrics again.
% With no change to model or metric algorithm,
% the algorithm does not execute and you
% see the same results returned.
execute(slmetric_obj);
rc = getMetrics(slmetric_obj);
```

See Also

slmetric.metric.ResultCollection | `slmetric.metric.getAvailableMetrics`

More About

- “Model Metrics Results API” on page 4-2
- “Collect Model Metrics Programmatically”
- “Model Metrics”

Introduced in R2016a

getMetrics

Class: slmetric.Engine
Package: slmetric

Collect model metric data

Syntax

```
Results = getMetrics(slmetric_obj)
Results = getMetrics(slmetric_obj,MetricIDs)
```

Description

Collect model metric data for the specified analysis root.

```
Results = getMetrics(slmetric_obj)
```

```
Results = getMetrics(slmetric_obj,MetricIDs)
```

Input Arguments

`slmetric_obj` — Metric engine object

`slmetric.Engine` object

Constructed `slmetric.Engine` object.

`MetricIDs` — Metric identifier

character vector | cell array of character vectors

Metric identifier, specified as a character vector or a cell array of character vectors.

Example: `'mathworks.metrics.DescriptiveBlockNames'`

Output Arguments

`Result` — Metric data

array of `slmetric.metric.ResultCollection` objects

Metric data, returned as an array of `slmetric.metric.ResultCollection` objects.

Examples

Collect Metrics

This example shows how to create a `slmetric.Engine` object, set the analysis root, and collect metrics for model `vdp`.

```
% Create an slmetric.Engine object
slmetric_obj = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(slmetric_obj,'Root','vdp','RootType','Model');

% Generate and collect model metrics
execute(slmetric_obj);
rc = getMetrics(slmetric_obj);
```

See Also

slmetric.metric.ResultCollection | `slmetric.metric.getAvailableMetrics`

More About

- “Model Metrics Results API” on page 4-2
- “Collect Model Metrics Programmatically”
- “Model Metrics”

Introduced in R2016a

getResults

Class: Advisor.Application
Package: Advisor

Access Model Advisor analysis results

Syntax

```
Results = getResults(app)
Results = getResults(app,Name,Value)
```

Description

Access `Application` object analysis results.

```
Results = getResults(app)
```

```
Results = getResults(app,Name,Value)
```

Input Arguments

`app` — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

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`.

`'IDs'` — Component IDs

cell array

Component IDs, as specified as a cell array of IDs

Data Types: `cell`

Output Arguments

`Result` — Analysis results

cell array of `ModelAdvisor.SystemResult` objects

Analysis results, returned as a cell array of `ModelAdvisor.SystemResult` objects.

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot | Advisor.Application.run | Advisor.Application.selectCheckInstances | Advisor.Application.deselectCheckInstances | `ModelAdvisor.run`

Introduced in R2015b

loadConfiguration

Class: Advisor.Application
Package: Advisor

Load Model Advisor configuration

Syntax

```
loadConfiguration(app,filename)
```

Description

`loadConfiguration(app,filename)` loads a Model Advisor configuration MAT-file.

Input Arguments

app — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

filename — Name of Model Advisor configuration MAT-file

character vector

Name of Model Advisor configuration MAT-file, specified as a character vector.

Example: `'MyConfiguration.mat'`

Data Types: `char`

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot

Introduced in R2015b

mcdcinfo

Retrieve modified condition/decision coverage information from `cvdata` object

Syntax

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

`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
`slObj`	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}`	Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

When specifying an S-function block, valid values for `object` include the following:

Object Specification	Description
`{BlockPath, fName}`	Cell array with the path to an S-Function block and the name of a source file.
`{BlockHandle, fName}`	Cell array with an S-Function block handle and the name of a source file.
`{BlockPath, fName, funName}`	Cell array with the path to an S-Function block, the name of a source file, and a function name.
`{BlockHandle, fName, funName}`	Cell array with an S-Function block handle, the name of a source file an a function name.

For coverage data collected during Software-in-the-Loop (SIL) mode or Processor-in-the-Loop (PIL) simulation mode, valid values for `object` include the following:

Object Specification	Description
`{fileName, funName}`	Cell array with the name of a source file and a function name.
`{Model, fileName}`	Cell array with a model name (or model handle) and the name of a source file.
`{Model, fileName, funName}`	Cell array with a model name (or model handle), the name of a source file, and a function name.

`mode`

The `mode` argument specifies the simulation mode for coverage. Valid values for `mode` include the following:

Object Specification	Description
`'Normal'`	Model in Normal simulation mode.
`'SIL' (or 'PIL')`	Model in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefSIL' (or 'ModelRefPIL')`	Model reference in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefTopSIL' (or 'ModelRefTopPIL')`	Model reference in Software-in-the-Loop (SIL or Processor-in-the-Loop (PIL) simulation mode with code interface set to top model.

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:

`covered_outcomes`	Number of condition/decision outcomes satisfied for `object`

total_outcomes	Total number of condition/decision outcomes for `object`

description

A structure array containing the following fields:

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

Examples

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

```
mdl = 'slvnvdemo_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 to collect MCDC coverage for a model:

1. Open the model.
2. In the Model Editor, select **Analysis > Coverage > Settings**.
3. On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. Under **Coverage metrics**, select **MCDC** as the structural coverage level.
5. On the **Coverage > Results** pane, specify the output you need.
6. Click **OK** to close the Configuration Parameters dialog box and save your changes.
7. Simulate the model and review the MCDC coverage results.

More About

- "Modified Condition/Decision Coverage (MCDC)"
- "MCDC Analysis"

See Also

`complexityinfo` | `cvsim` | `conditioninfo` | `decisioninfo` | `getCoverageInfo` | `overflowsaturationinfo` | `sigrangeinfo` | `sigsizeinfo` | `tableinfo`

Introduced in R2006b

mdltransformer

Open Model Transformer

Syntax

```
mdltransformer(model)
```

Description

`mdltransformer(model)` opens the Model Transformer for a model specified by `model`. If the specified model is not open, this command opens it.

Examples

Open Model Transformer for model

Open the Model Transformer for `rtwdemo_reusable_sys_outputs` example model:

```
mdltransformer('rtwdemo_reusable_sys_outputs')
```

- "Transform Model to Variant System "
- "Enable Component Reuse with Clone Detection"

Input Arguments

`model` — Model name

character vector

Model name or handle, specified as a character vector.

Data Types: `char`

Introduced in R2016b

slmetric.metric.Metric class

Package: slmetric.metric

Abstract class for creating model metrics

Description

Abstract base class for creating model metrics. To create a new model metric, create a MATLAB class that derives from the `slmetric.metric.Metric` class.

Properties

`CompileContext` — Compile mode

character vector

Compile mode for metric calculation. If your model metric requires model compilation, specify `'PostCompile'`. If your model metric does not require model compilation, specify `'None'`.

Example: `'PostCompile'`

Data Types: `char`

`ComponentScope` — Component scope

array of `Advisor.component.Types` enum values

Model components for which metric is calculated. The metric is calculated for all components that match the type.

`Description` — Metric description

character vector

Metric description.

Data Types: `char`

`ID` — Metric ID

character vector

Unique metric identifier.

Data Types: `char`

`Version` — Metric version number
integer

Metric version.

Data Types: `uint32`

Methods

algorithm	Specify logic for metric algorithm analysis

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects in the MATLAB documentation.

See Also

slmetric.Engine | `slmetric.metric.createNewMetricClass` | `slmetric.metric.getAvailableMetrics`

More About

- "Create Model Metrics by Using APIs"
- "Model Metrics Results API" on page 4-2
- "Model Metrics"
- Class Attributes
- Property Attributes

Introduced in R2016a

algorithm

Class: slmetric.metric.Metric
Package: slmetric.metric

Specify logic for metric algorithm analysis

Syntax

```
Result = algorithm(Metric,Component)
```

Description

Specify logic for metric algorithm analysis.

```
Result = algorithm(Metric,Component)
```

Input Arguments

`Metric` — Metric object

`Metric` object

Instance of `Metric` object, derived from `slmetric.metric.Metric` class, to use for metric analysis.

`Component` — Component object

`Advisor.component.Component` object

Instance of `Advisor.component.Component` object. to use for metric analysis.

Output Arguments

`Result` — Algorithm calculation

array of `slmetric.metric.Result` objects

Algorithm data, returned as an array of `slmetric.metric.Result` objects.

Examples

Create Metric Algorithm for Nonvirtual Block Count

This example shows how to use the `algorithm` method to create a nonvirtual block count metric.

1. Using the `createNewMetricClass` function, create a new metric algorithm class with name `nonvirtualblockcount`. The function creates the `nonvirtualblockcount.m` file in the current working folder.

```
className = 'nonvirtualblockcount';
slmetric.metric.createNewMetricClass(className);
```

2. Open and edit the metric algorithm file `nonvirtualblockcount.m`. The file contains an empty metric algorithm method.

```
edit(className);
```

3. Copy and paste the following code into the `nonvirtualblockcount.m` file. Save `nonvirtualblockcount.m`. The code provides a metric algorithm for counting the nonvirtual blocks.

```
% nonvirtualblockcount calculate number of non-virtual blocks per level.
% BusCreator, BusSelector and BusAssign are treated as non-virtual.
properties
    VirtualBlockTypes = {'Demux','From','Goto','Ground', ...
        'GotoTagVisiblity','Mux','SignalSpecification', ...
        'Terminator','Inport'};
end

methods
function this = nonvirtualblockcount()
    this.ID = 'nonvirtualblockcount';
    this.Version = 1;
    this.CompileContext = 'None';
    this.Description = 'Algorithm that counts nonvirtual blocks per level.';
    this.ComponentScope = [Advisor.component.Types.Model, ...
        Advisor.component.Types.SubSystem];
end

function res = algorithm(this, component)
    % create a result object for this component
    res = slmetric.metric.Result();
```

```
% set the component and metric ID
res.ComponentID = component.ID;
res.MetricID = this.ID;

% use find_system to get all blocks inside this component
blocks = find_system(getPath(component), ...
    'SearchDepth', 1, ...
    'Type', 'Block');

isNonVirtual = true(size(blocks));

for n=1:length(blocks)
    blockType = get_param(blocks{n}, 'BlockType');

    if any(strcmp(this.VirtualBlockTypes, blockType))
        isNonVirtual(n) = false;
    else
        switch blockType
            case 'SubSystem'
                % Virtual unless the block is conditionally executed
                % or the Treat as atomic unit check box is selected.
                if strcmp(get_param(blocks{n}, 'IsSubSystemVirtual'), ...
                        'on')
                    isNonVirtual(n) = false;
                end
            case 'Outport'
                % Outport: Virtual when the block resides within
                % any SubSystem block (conditional or not), and
                % does not reside in the root (top-level) Simulink window.
                if component.Type ~= Advisor.component.Types.Model
                    isNonVirtual(n) = false;
                end
            case 'Selector'
                % Virtual only when Number of input dimensions
                % specifies 1 and Index Option specifies Select
                % all, Index vector (dialog), or Starting index (dialog).
                nod = get_param(blocks{n}, 'NumberOfDimensions');
                ios = get_param(blocks{n}, 'IndexOptionArray');

                ios_settings = {'Assign all', 'Index vector (dialog)', ...
                    'Starting index (dialog)'};

                if nod == 1 && any(strcmp(ios_settings, ios))
```

```
                            isNonVirtual(n) = false;
                        end
                    case 'Trigger'
                        % Virtual when the output port is not present.
                        if strcmp(get_param(blocks{n}, 'ShowOutputPort'), 'off')
                            isNonVirtual(n) = false;
                        end
                    case 'Enable'
                        % Virtual unless connected directly to an Outport block.
                        isNonVirtual(n) = false;

                        if strcmp(get_param(blocks{n}, 'ShowOutputPort'), 'on')
                            pc = get_param(blocks{n}, 'PortConnectivity');

                            if ~isempty(pc.DstBlock) && ...
                                    strcmp(get_param(pc.DstBlock, 'BlockType'), ...
                                    'Outport')
                                isNonVirtual(n) = true;
                            end
                        end
                end
            end
        end

        blocks = blocks(isNonVirtual);

        res.Value = length(blocks);
    end
    end
end
```

See Also

slmetric.metric.Result | `slmetric.metric.createNewMetricClass`

More About

- “Create Model Metrics by Using APIs”
- “Model Metrics”

Introduced in R2016a

Advisor.component.Component class

Package: Advisor.component

Create component for metric analysis

Description

Use instances of `Advisor.components.Component` to create a component for metric analysis.

Construction

`component_obj = Advisor.components.Component` creates a model component object.

Properties

`ID` — Component ID

character vector

Component identifier. This property is read/write.

`Type` — Component type

enum

Component type, as specified by `Advisor.component.Types`. This property is read/write.

`Name` — Component name

character vector

Model component name. This property is read/write.

Methods

getPath	Retrieve component path

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects in the MATLAB documentation.

See Also

Advisor.component.Types | slmetric.metric.Metric

More About

- “Model Metrics Results API” on page 4-2
- “Model Metrics”
- Class Attributes
- Property Attributes

Introduced in R2016a

getPath

Class: Advisor.component.Component
Package: Advisor.component

Retrieve component path

Syntax

```
path = getPath(component)
```

Description

`path = getPath(component)` retrieves the path to the component.

Input Arguments

`component` — Component

`Advisor.component.Component` model object

Constructed `Advisor.component.Component` model object.

Output Arguments

`path` — Model component path

character vector

Model component path, specified as a character vector.

See Also

Advisor.component.Types

Introduced in R2016a

Advisor.component.Types class

Package: Advisor.component

Create enum class specifying component type

Description

Create an enumeration `Advisor.component.Types` class to specify the model component type.

Construction

`enum_comp_type = Advisor.component.Type.Model` creates an enumeration of component type `Model`. The following table lists the component types.

Type	Description
`Model`	Simulink block diagram.
`LibraryBlock`	Library linked block.
`MFile`	MATLAB code file.
`ProtectedModel`	Protect Simulink block diagram.
`SubSystem`	Simulink subsystem block.
`ModelBlock`	Simulink model block.
`Chart`	Stateflow chart or Stateflow block.
`MATLABFunction`	MATLAB function block.

See Also

slmetric.metric.Metric | Advisor.component.Component

More About

- "Model Metrics"
- Class Attributes

- Property Attributes

Introduced in R2016a

ModelAdvisor.Action class

Package: ModelAdvisor

Add actions to custom checks

Description

Instances of this class define actions you take when the Model Advisor checks do not pass. Users access actions by clicking the **Action** button that you define in the Model Advisor window.

Construction

ModelAdvisor.Action	Add actions to custom checks

Methods

setCallbackFcn	Specify action callback function

Properties

Description	Message in **Action** box
Name	Action button label

Copy Semantics

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

Examples

```
% define action (fix) operation
```

```
myAction = ModelAdvisor.Action;
myAction.Name='Fix block fonts';
myAction.Description=...
   'Click the button to update all blocks with specified font';
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

ModelAdvisor.Action

Class: ModelAdvisor.Action
Package: ModelAdvisor

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

- "Create Model Advisor Checks"

ModelAdvisor.Check class

Package: ModelAdvisor

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`.

Construction

ModelAdvisor.Check	Create custom checks

Methods

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

Properties

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 **Explore Result** button
Result	Results cell array
supportExclusion	Set to support exclusions
SupportLibrary	Set to support library models
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

- "Create Model Advisor Checks"

ModelAdvisor.Check

Class: ModelAdvisor.Check
Package: ModelAdvisor

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

- "Create Model Advisor Checks"

ModelAdvisor.FactoryGroup class

Package: ModelAdvisor

Define subfolder in **By Task** folder

Description

The `ModelAdvisor.FactoryGroup` class defines a new subfolder to add to the **By Task** folder.

Construction

ModelAdvisor.FactoryGroup	Define subfolder in **By Task** folder

Methods

addCheck	Add check to folder

Properties

Description	Description of folder
DisplayName	Name of folder
ID	Identifier for folder
MAObj	Model Advisor object

Copy Semantics

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

Examples

```
% --- sample factory group
rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

ModelAdvisor.FactoryGroup

Class: ModelAdvisor.FactoryGroup
Package: ModelAdvisor

Define subfolder in **By Task** folder

Syntax

```
fg_obj = ModelAdvisor.FactoryGroup(fg_ID)
```

Description

`fg_obj = ModelAdvisor.FactoryGroup(fg_ID)` creates a handle to a factory group object, `fg_obj`, and assigns it a unique identifier, `fg_ID`. `fg_ID` must remain constant.

Examples

```
% --- sample factory group
rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

ModelAdvisor.FormatTemplate class

Package: ModelAdvisor

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

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

```
function sl_customization(cm)

% register custom checks
cm.addModelAdvisorCheckFcn(@defineModelAdvisorChecks);

% register custom factory group
cm.addModelAdvisorTaskFcn(@defineModelAdvisorTasks);


% ------------------------------
% defines Model Advisor Checks
% ------------------------------
function defineModelAdvisorChecks

% Define and register a sample check
rec = ModelAdvisor.Check('mathworks.example.SampleStyleOne');
rec.Title = 'Sample check for Model Advisor using the ModelAdvisor.FormatTemplate';
setCallbackFcn(rec, @SampleStyleOneCallback,'None','StyleOne');

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


% ------------------------------
% defines Model Advisor Tasks
% ------------------------------
function defineModelAdvisorTasks
mdladvRoot = ModelAdvisor.Root;

% --- sample factory group
rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');
rec.DisplayName='My Group 1';
```

```
rec.Description='Demo Factory Group';
rec.addCheck('mathworks.example.SampleStyleOne');
mdladvRoot.publish(rec); % publish inside By Group list

% -----------------------------
% 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
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, supress 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);
```

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

Result: Passed

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	model/Constant
2	model/Constant1
3	model/Gain
4	model/Product
5	model/Out1

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)

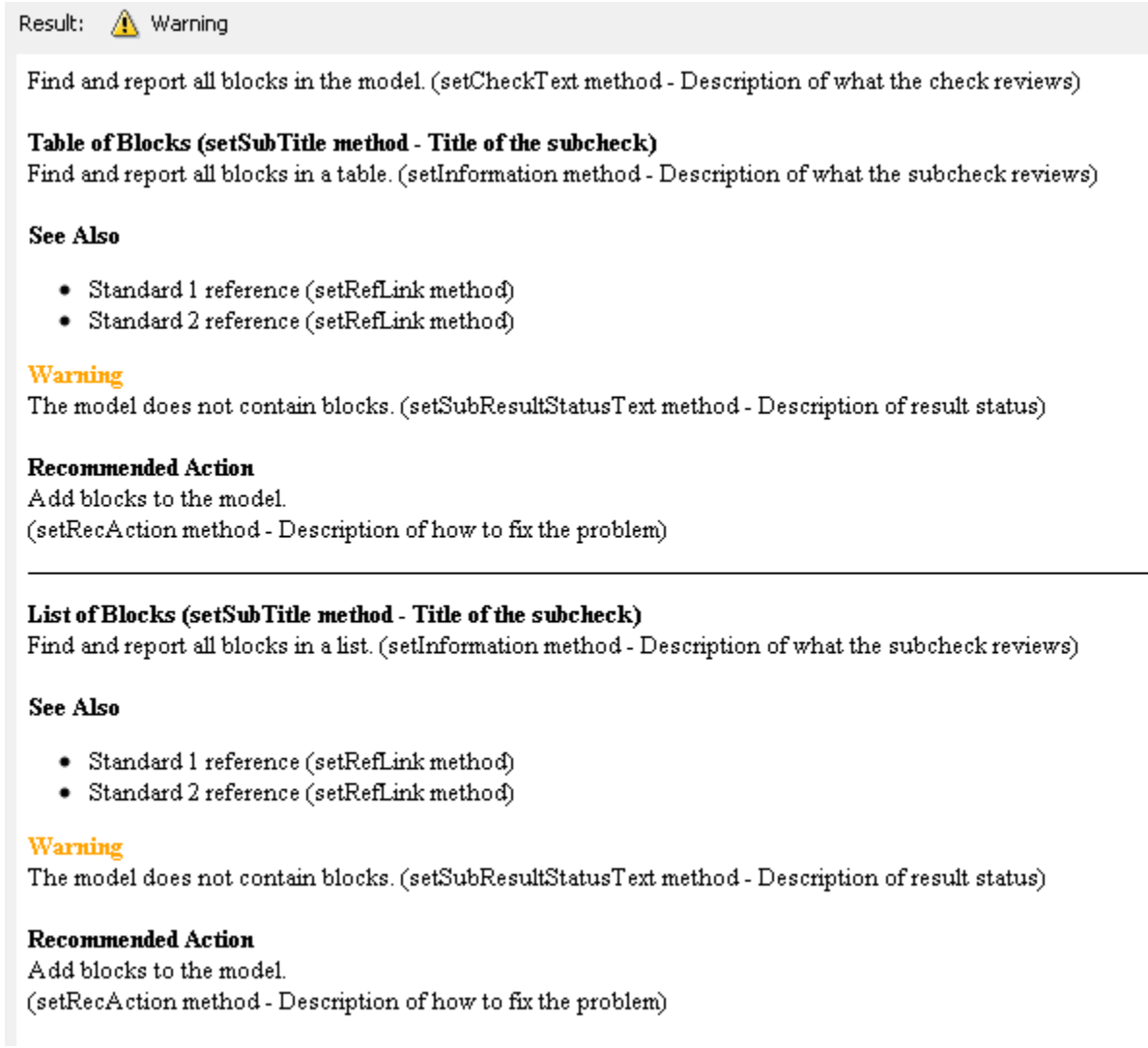
See Also

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

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

- model
- model/Constant
- model/Constant1
- model/Gain
- model/Product
- model/Out1

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



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

- "Create Model Advisor Checks"
- "Format Check Results"

ModelAdvisor.FormatTemplate

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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 character vector 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

- "Create Model Advisor Checks"

- “Format Check Results”

ModelAdvisor.Group class

Package: ModelAdvisor

Define custom folder

Description

The `ModelAdvisor.Group` class defines a folder that is displayed in the Model Advisor tree. Use folders to consolidate checks by functionality or usage.

Construction

ModelAdvisor.Group	Define custom folder

Methods

addGroup	Add subfolder to folder
addProcedure	Add procedure to folder
addTask	Add task to folder

Properties

Description	Description of folder
DisplayName	Name of folder
ID	Identifier for folder
MAObj	Model Advisor object

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

- "Create Model Advisor Checks"

ModelAdvisor.Group

Class: ModelAdvisor.Group
Package: ModelAdvisor

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

- "Create Model Advisor Checks"

ModelAdvisor.Image class

Package: ModelAdvisor

Include image in Model Advisor output

Description

The `ModelAdvisor.Image` class adds an image to the Model Advisor output.

Construction

ModelAdvisor.Image	Include image in Model Advisor output

Methods

setHyperlink	Specify hyperlink location
setImageSource	Specify image location

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

- "Create Model Advisor Checks"
- "Format Check Results"

ModelAdvisor.Image

Class: ModelAdvisor.Image
Package: ModelAdvisor

Include image in Model Advisor output

Syntax

```
object = ModelAdvisor.Image
```

Description

`object = ModelAdvisor.Image` 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.

Examples

```
image_obj = ModelAdvisor.Image;
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"
- "Format Check Results"

ModelAdvisor.InputParameter class

Package: ModelAdvisor

Add input parameters to custom checks

Description

Instances of the `ModelAdvisor.InputParameter` class specify the input parameters a custom check uses in analyzing the model. Access input parameters in the Model Advisor window.

Construction

ModelAdvisor.InputParameter	Add input parameters to custom checks

Methods

setColSpan	Specify number of columns for input parameter
setRowSpan	Specify rows for input parameter

Properties

Description	Description of input parameter
Entries	Drop-down list entries
Name	Input parameter name
Type	Input parameter type
Value	Value of input parameter

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

- "Create Model Advisor Checks"

ModelAdvisor.InputParameter

Class: ModelAdvisor.InputParameter
Package: ModelAdvisor

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, `slvnvdemo_mdladv`. The example does not execute as shown without the additional content found in the `sl_customization.m` file.

```
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

- “Create Model Advisor Checks”

ModelAdvisor.LineBreak class

Package: ModelAdvisor

Insert line break

Description

Use instances of the `ModelAdvisor.LineBreak` class to insert line breaks in the Model Advisor outputs.

Construction

ModelAdvisor.LineBreak	Insert line break

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

- "Create Model Advisor Checks"
- "Format Check Results"

ModelAdvisor.LineBreak

Class: ModelAdvisor.LineBreak
Package: ModelAdvisor

Insert line break

Syntax

```
ModelAdvisor.LineBreak
```

Description

`ModelAdvisor.LineBreak` inserts a line break into the Model Advisor output.

Examples

Add a line break between two lines of text:

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

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"
- "Format Check Results"

ModelAdvisor.List class

Package: ModelAdvisor

Create list class

Description

Use instances of the `ModelAdvisor.List` class to create list-formatted outputs.

Construction

ModelAdvisor.List	Create list class

Methods

addItem	Add item to list
setType	Specify list type

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

- "Create Model Advisor Checks"
- "Format Check Results"

ModelAdvisor.List

Class: ModelAdvisor.List
Package: ModelAdvisor

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

- "Create Model Advisor Checks"
- "Format Check Results"

ModelAdvisor.ListViewParameter class

Package: ModelAdvisor

Add list view parameters to custom checks

Description

The Model Advisor uses list view parameters to populate the Model Advisor Result Explorer. Access the information in list views by clicking **Explore Result** in the Model Advisor window.

Construction

ModelAdvisor.ListViewParameter	Add list view parameters to custom checks

Properties

Attributes	Attributes to display in Model Advisor Report Explorer
Data	Objects in Model Advisor Result Explorer
Name	Drop-down list entry

Copy Semantics

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

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

ModelAdvisor.ListViewParameter

Class: ModelAdvisor.ListViewParameter
Package: ModelAdvisor

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"
- "Create Model Advisor Checks"
- "Batch-Fix Warnings or Failures"
- "Customization Example"
- "getListViewParameters"
- "setListViewParameters"

ModelAdvisor.lookupCheckID

Package: ModelAdvisor

Look up Model Advisor check ID

Syntax

```
NewID = ModelAdvisor.lookupCheckID('OldCheckID')
```

Description

`NewID = ModelAdvisor.lookupCheckID('OldCheckID')` returns the check ID of the check specified by `OldCheckID`. `OldCheckID` is the ID of a check prior to R2010b.

Input Arguments

`OldCheckID`

`OldCheckID` is the ID of a check prior to R2010b.

Output Arguments

`NewID`

Check ID that corresponds to the previous check ID identified by `OldCheckID`.

Examples

Look up the check ID for **By Product > Simulink Verification and Validation > Modeling Standards > DO-178C/DO-331 Checks > Check safety-related optimization settings** using the previous ID `DO178B:OptionSet`:

```
NewID = ModelAdvisor.lookupCheckID('DO178B:OptionSet');
```

Alternatives

"Archive and View Results"

More About

- "Archive and View Results"

See Also

`ModelAdvisor.run`

Introduced in R2010b

ModelAdvisor.Paragraph class

Package: ModelAdvisor

Create and format paragraph

Description

The `ModelAdvisor.Paragraph` class creates and formats a paragraph object.

Construction

ModelAdvisor.Paragraph	Create and format paragraph

Methods

addItem	Add item to paragraph
setAlign	Specify paragraph alignment

Copy Semantics

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

Examples

```
% Check Simulation optimization setting
ResultDescription{end+1} = ModelAdvisor.Paragraph(['Check Simulation '...
'optimization settings:']);
```

See Also

“Model Advisor Customization”

How To

- “Create Model Advisor Checks”
- “Format Check Results”

ModelAdvisor.Paragraph

Class: ModelAdvisor.Paragraph
Package: ModelAdvisor

Create and format paragraph

Syntax

```
para_obj = ModelAdvisor.Paragraph
```

Description

`para_obj = ModelAdvisor.Paragraph` defines a paragraph object `para_obj`.

Examples

```
% Check Simulation optimization setting
ResultDescription{end+1} = ModelAdvisor.Paragraph(['Check Simulation '...
'optimization settings:']);
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

ModelAdvisor.Procedure class

Package: ModelAdvisor

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: `''` (empty character vector)

`Name`

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

Default: `''` (empty character vector)

`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`.

`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

- "Create Procedures"
- "Create a Procedural-Based Configuration"
- "Create Model Advisor Checks"

ModelAdvisor.Procedure

Class: ModelAdvisor.Procedure
Package: ModelAdvisor

Define custom procedures

Syntax

```
procedure_obj = ModelAdvisor.Procedure(procedure_ID)
```

Description

`procedure_obj = ModelAdvisor.Procedure(procedure_ID)` creates a handle to a procedure object, `procedure_obj`, and assigns it a unique identifier, `procedure_ID`. `procedure_ID` must remain constant.

Examples

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

See Also

"Model Advisor Customization"

How To

- "Create Procedures"
- "Create a Procedural-Based Configuration"
- "Create Model Advisor Checks"

ModelAdvisor.Root class

Package: ModelAdvisor

Identify root node

Description

The `ModelAdvisor.Root` class returns the root object.

Construction

ModelAdvisor.Root	Identify root node

Methods

publish	Publish object in Model Advisor root
register	Register object in Model Advisor root

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

- "Create Model Advisor Checks"

ModelAdvisor.Root

Class: ModelAdvisor.Root
Package: ModelAdvisor

Identify root node

Syntax

```
root_obj = ModelAdvisor.Root
```

Description

`root_obj = ModelAdvisor.Root` creates a handle to the root object, `root_obj`.

Examples

```
mdladvRoot = ModelAdvisor.Root;
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

ModelAdvisor.run

Package: ModelAdvisor

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`.

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 “Find 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'`

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. The Parallel Computing Toolbox does not support 32-bit Windows® machines. Each parallel process runs checks

on one model at a time. For an example, see “Create a Function for Checking Multiple Systems in Parallel”.

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 “Save and Load Process for Objects”).

`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 `slvnvdemo_mdladv_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 = 'slvnvdemo_mdladv_config.mat';
SysList={'sldemo_auto_climatecontrol/Heater Control',...
    'sldemo_auto_climatecontrol/AC Control'};

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

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.

More About

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.

- "Automate Model Advisor Check Execution"
- "Find Check IDs"
- "Organize Checks and Folders Using the Model Advisor Configuration Editor"
- "Save and Load Process for Objects"

See Also

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

Introduced in R2010b

ModelAdvisor.summaryReport

Package: ModelAdvisor

Open Model Advisor Command-Line Summary report

Syntax

```
ModelAdvisor.summaryReport(SysResultObjArray)
```

Description

`ModelAdvisor.summaryReport(SysResultObjArray)` opens the Model Advisor Command-Line Summary report in a web browser. SysResultObjArray is a cell array of `ModelAdvisor.SystemResult` objects returned by `ModelAdvisor.run`.

Input Arguments

SysResultObjArray

Cell array of `ModelAdvisor.SystemResult` objects returned by `ModelAdvisor.run`.

Examples

Opens the Model Advisor Command-Line Summary report after running the Model Advisor:

```
% Identify Model Advisor configuration file.
% Create list of models to run.
fileName = 'slvnvdemo_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)
```

Alternatives

"View Results in Model Advisor Command-Line Summary Report"

More About

- "Automate Model Advisor Check Execution"
- "Archive and View Model Advisor Run Results"

See Also

`ModelAdvisor.run` | `view` | `viewReport`

Introduced in R2010b

ModelAdvisor.Table class

Package: ModelAdvisor

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

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

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

- "Create Model Advisor Checks"
- "Format Check Results"

ModelAdvisor.Table

Class: ModelAdvisor.Table
Package: ModelAdvisor

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 number of rows (`row`) and columns (`column`) that you specify.

Examples

Create two table objects

Create two table objects, `table1` and `table2`. The Model Advisor displays `table1` in the results as a table with one row and one column. The Model Advisor display `table2` in the results as a table with two rows and three columns.

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

Create table with five rows and five columns

Create a table with five rows and five columns containing randomly generated numbers.

Use the following MATLAB code in a callback function. The Model Advisor displays `table1` in the results.

```
% ModelAdvisor.Table example

matrixData = rand(5,5) * 10^5;
```

```
% initialize a table with 5 rows and 5 columns (heading rows not counting)
table1 = ModelAdvisor.Table(5,5);

% set column headings
for n=1:5
    table1.setColHeading(n, ['Column ', num2str(n)]);
end

% set alignment of second column heading
table1.setColHeadingAlign(2, 'center');

% set column width of second column
table1.setColWidth(2, 3);

% set row headings
for n=1:5
    table1.setRowHeading(n, ['Row ', num2str(n)]);
end

% set Table content
for rowIndex=1:5
    for colIndex=1:5
        table1.setEntry(rowIndex, colIndex, ...
            num2str(matrixData(rowIndex, colIndex)));

        % set alignment of entries in second row
        if colIndex == 2
            table1.setEntryAlign(rowIndex, colIndex, 'center');
        end
    end
end

% overwrite content of cell 3,3 with a ModelAdvisor.Text
text = ModelAdvisor.Text('Example Text');
table1.setEntry(3,3, text)
```

	Column 1	Column 2	Column 3	Column 4	Column 5
Row 1	81472.3686	9754.0405	15761.3082	14188.6339	65574.0699
Row 2	90579.1937	27849.8219	97059.2782	42176.1283	3571.1679
Row 3	12698.6816	54688.1519	Example Text	91573.5525	84912.9306
Row 4	91337.5856	95750.6835	48537.5649	79220.733	93399.3248
Row 5	63235.9246	96488.8535	80028.0469	95949.2426	67873.5155

See Also

ModelAdvisor.Table.setColHeading |
ModelAdvisor.Table.setColHeadingAlign |

`ModelAdvisor.Table.setColWidth` | `ModelAdvisor.Table.setRowHeading` | `ModelAdvisor.Table.setEntry` | `ModelAdvisor.Table.setEntryAlign` | `ModelAdvisor.Text`

How To

- "Create Callback Functions and Results"

ModelAdvisor.Task class

Package: ModelAdvisor

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

Description	Description of task
DisplayName	Name of task
Enable	Indicate if user can enable and disable task

ID	Identifier for task
LicenseName	Product license names required to display and run task
MAObj	Model Advisor object
Value	Status of task
Visible	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

- "Create Model Advisor Checks"

ModelAdvisor.Task

Class: ModelAdvisor.Task
Package: ModelAdvisor

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

- “Create Model Advisor Checks”

ModelAdvisor.Text class

Package: ModelAdvisor

Create Model Advisor text output

Description

Instances of `ModelAdvisor.Text` class create formatted text for the Model Advisor output.

Construction

ModelAdvisor.Text	Create Model Advisor text output

Methods

setBold	Specify bold text
setColor	Specify text color
setHyperlink	Specify hyperlinked text
setItalic	Italicize text
setRetainSpaceReturn	Retain spacing and returns in text
setSubscript	Specify subscripted text
setSuperscript	Specify superscripted text
setUnderlined	Underline text

Copy Semantics

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

Examples

```
t1 = ModelAdvisor.Text('This is some text');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"
- "Format Check Results"

ModelAdvisor.Text

Class: ModelAdvisor.Text
Package: ModelAdvisor

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

`content`	Optional character vector specifying the content of the text object. If *`content`* is empty, empty text is output.
`attribute`	Optional cell array of character vectors specifying the formatting of the content. If no attribute is specified, the output text has default coloring with no formatting. Possible formatting options include: • `'normal'` (default) — Text is default color and style. • `'bold'` — Text is bold. • `'italic'` — Text is italicized. • `'underline'` — Text is underlined. • `'pass'` — Text is green. • `'warn'` — Text is yellow. • `'fail'` — Text is red. • `'keyword'` — Text is blue.

- `'subscript'` — Text is subscripted.
- `'superscript'` — Text is superscripted.

Output Arguments

`text`	The text object you create

Examples

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

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"
- "Format Check Results"

overflowsaturationinfo

Retrieve saturation on integer overflow coverage from `cvdata` object

Syntax

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

Description

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

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

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

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 `slvnvdemo_saturation_on_overflow_coverage`. Review collected coverage results and description for Sum block in Controller subsystem.

Open the `slvnvdemo_saturation_on_overflow_coverage` example model.

```
open_system('slvnvdemo_saturation_on_overflow_coverage');
```

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

```
dataObj = cvsim('slvnvdemo_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.

```
[covResults, covDesc] = overflowsaturationinfo(dataObj, ...
  'slvnvdemo_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.

- "Command Line Verification Tutorial"

Input Arguments

`covdata` — 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
`slObj`	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}`	Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

Example: `'slvnvdemo_saturation_on_overflow_coverage'`

Example: `get_param('slvnvdemo_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

Data Types: `logical`

Output Arguments

`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:

`isFiltered`	`0` if the model component specified by `object` is not excluded from coverage recording. `1` if the model component specified by `object` is excluded from coverage recording. For more information about excluding objects from coverage, see "Coverage Filtering".
`decision.text`	`'Saturate on integer overflow'`
`decision.outcome`	Structure array containing two fields for each coverage outcome:

`executionCount`	Number of times saturation on integer overflow for `object` evaluated

	to the outcome described by `text`.
`text`	`'true'` or `'false'`
	Saturation on integer overflow has two possible outcomes, `'true'` and `'false'`.
`decision.isFiltered`	`0` if the model component specified by `object` is not excluded from coverage recording. `1` if the model component specified by `object` is excluded from coverage recording. For more information about excluding objects from coverage, see "Coverage Filtering".
`decision.filterRationale`	Rationale for filtering the model component specified by `object`, if `object` is excluded from coverage and a rationale is specified. For more information about excluding objects from coverage, see "Coverage Filtering".

Data Types: `struct`

More About

- "Saturate on Integer Overflow Coverage"

See Also

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

Introduced in R2013a

relationalboundaryinfo

Retrieve relational boundary coverage from `cvdata` object

Syntax

```
coverage = relationalboundaryinfo(covdata, object)
coverage = relationalboundaryinfo(covdata, object,mode)
coverage = relationalboundaryinfo(covdata, object,
ignore_descendants)
[coverage, description] = relationalboundaryinfo(covdata, object)
```

Description

`coverage = relationalboundaryinfo(covdata, object)` returns relational boundary coverage results from the `cvdata` object `covdata` for the model object specified by `object` and its descendants.

`coverage = relationalboundaryinfo(covdata, object,mode)` returns relational boundary coverage results from the `cvdata` object `covdata` for the model object specified by `object` and its descendants for the simulation mode `mode`.

`coverage = relationalboundaryinfo(covdata, object, ignore_descendants)` returns relational boundary coverage results from the `cvdata` object `covdata` for the model object specified by `object` and, depending on the value of `ignore_descendants`, descendant objects.

`[coverage, description] = relationalboundaryinfo(covdata, object)` returns relational boundary coverage results from the `cvdata` object `covdata` for the model object specified by `object`, and textual descriptions of each coverage outcome.

Examples

Collect Relational Boundary Coverage for Supported Block in Model

This example shows how to collect relational boundary coverage information for a `Saturation` block in a model. For more information on blocks supported for relational boundary coverage, see “Model Objects That Receive Coverage”.

Open the `slvnvdemo_cv_small_controller` model. Create a model coverage test specification object for the model.

```
open_system('slvnvdemo_cv_small_controller');
testObj = cvtest('slvnvdemo_cv_small_controller');
```

In the model coverage test specification object, activate relational boundary coverage.

```
testObj.settings.relationalop = 1;
```

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

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

Obtain relational boundary coverage results for the `Saturation` block in `slvnvdemo_cv_small_controller`. The coverage results are stored in a two-element vector of the form `[covered_outcomes total_outcomes]`.

```
blockHandle = get_param('slvnvdemo_cv_small_controller/Saturation','Handle');;
[covResults, covDesc] = relationalboundaryinfo(dataObj, blockHandle)
```

```
covResults =

     2     4


covDesc =

    isFiltered: 0
      decision: [1x2 struct]
```

The field `decision` is a `1 X 2` structure. Each element of `decision` corresponds to a relational operation in the block. The `Saturation` block contains two comparisons. The first comparison is with a lower limit and the second with an upper limit. Therefore, `decision` is a 2-element structure.

View the first operation in the block that receives relational boundary coverage. For the Saturation block, the first relational operation is `input > lowerlimit`.

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

```
ans =
```

```
            outcome: [1x2 struct]
               text: 'input - lowerlimit'
         isFiltered: 0
    filterRationale: ''
```

The `text` field shows the two operands. The `isFiltered` field is set to 1 if the block is filtered from relational boundary coverage. For more information, see "Coverage Filtering".

View results for the first relational operation in the block.

```
for(i=1:2)
  covDesc.decision(1).outcome(i)
end
```

```
ans =

     isActive: 1
    execCount: 0
         text: '[-tol..0]'


ans =

     isActive: 1
    execCount: 0
         text: '(0..tol]'
```

View the second operation in the block that receives relational boundary coverage. For the Saturation block, the second relational operation is `input < upperlimit`.

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

```
ans =

            outcome: [1x2 struct]
               text: 'input - upperlimit'
         isFiltered: 0
    filterRationale: ''
```

View results for the second relational operation in the block.

```
for(i=1:2)
  covDesc.decision(2).outcome(i)
```

```
end

ans =

     isActive: 1
    execCount: 1
         text: '[-tol..0)'


ans =

     isActive: 1
    execCount: 2
         text: '[0..tol]'
```

- “Command Line Verification Tutorial”

Input Arguments

`covdata` — 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
`slObj`	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	Description
`{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}`	Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

When specifying an S-function block, valid values for `object` include the following:

Object Specification	Description
`{BlockPath, fName}`	Cell array with the path to an S-Function block and the name of a source file.
`{BlockHandle, fName}`	Cell array with an S-Function block handle and the name of a source file.
`{BlockPath, fName, funName}`	Cell array with the path to an S-Function block, the name of a source file, and a function name.
`{BlockHandle, fName, funName}`	Cell array with an S-Function block handle, the name of a source file an a function name.

For coverage data collected during Software-in-the-Loop (SIL) mode or Processor-in-the-Loop (PIL) simulation mode, valid values for `object` include the following:

Object Specification	Description
`{fileName, funName}`	Cell array with the name of a source file and a function name.
`{Model, fileName}`	Cell array with a model name (or model handle) and the name of a source file.
`{Model, fileName, funName}`	Cell array with a model name (or model handle), the name of a source file, and a function name.

Example: `get_param('slvnvdemo_cv_small_controller/Saturation', 'Handle')`

`mode`

The `mode` argument specifies the simulation mode for coverage. Valid values for `mode` include the following:

Object Specification	Description
`'Normal'`	Model in Normal simulation mode.
`'SIL' (or 'PIL')`	Model in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefSIL' (or 'ModelRefPIL')`	Model reference in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode.
`'ModelRefTopSIL' (or 'ModelRefTopPIL')`	Model reference in Software-in-the-Loop (SIL or Processor-in-the-Loop (PIL) simulation mode with code interface set to top model.

`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

Data Types: `logical`

Output Arguments

`coverage` — Relational boundary coverage results for `object`
numerical vector

Relational boundary coverage results, stored in a two-element vector of the form `[covered_outcomes total_outcomes]`. The two elements are:

`covered_outcomes`	Number of relational boundary outcomes satisfied for `object`
`total_outcomes`	Total number of relational boundary 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 relational boundary coverage is collected, the structure array contains the following fields:

`isFiltered`	`0` if the model component specified by `object` is not excluded from coverage recording. `1` if the model component specified by `object` is excluded from coverage recording. For more information about excluding objects from coverage, see "Coverage Filtering".
`decision.text`	Character vector of the form: *op_1-op_2* • *op_1* is the left operand in the relational operation. • *op_2* is the right operand in the relational operation.
`decision.outcome`	Structure array containing two fields for each coverage outcome:

`isActive`	Boolean variable. If this variable is `false`, it indicates that decisions were not evaluated during simulation due to variable signal size.
`execCount`	Number of times *op_1-op_2* fell in the range described by `text`
`text`	The range around the relational boundary considered for coverage. For more information,

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

Data Types: `struct`

More About

- “Relational Boundary Coverage”

See Also

`complexityinfo` | `conditioninfo` | `cvsim` | `cvtest` | `decisioninfo` | `getCoverageInfo` | `mcdcinfo` | `overflowsaturationinfo` | `sigrangeinfo` | `sigsizeinfo` | `tableinfo`

Introduced in R2014b

publish

Class: ModelAdvisor.Root
Package: ModelAdvisor

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 character vector to indicate multiple subfolders. For example, to add a check to the **Simulink Verification and Validation** > **Modeling Standards** folder, use the following: `'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”

refresh_customizations

Class: Advisor.Manager
Package: Advisor

Refresh Model Advisor check information cache

Syntax

```
Advisor.Manager.refresh_customizations()
```

Description

`Advisor.Manager.refresh_customizations()` refreshes the Model Advisor check information cache.

Alternatives

To refresh the cache from Model Advisor, select **Settings** > **Preferences**. Click **Update check information cache**, then click **OK**. To see updates, close and reopen model, then start Model Advisor.

Related Examples

- “Create and Add Custom Checks - Basic Examples”
- “Create Check for Model Configuration Parameters”

Introduced in R2016b

register

Class: ModelAdvisor.Root
Package: ModelAdvisor

Register object in Model Advisor root

Syntax

```
register(MAobj, obj)
```

Description

`register(MAobj, obj)` registers the object, *`obj`*, in the root object `MAobj`.

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');
mdladvRoot.register(MAT3)
```

rmi

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('guidget', object)

rmi('report', model)
rmi('report', matlabFilePath)
rmi('report', dictionaryFile)
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('check', dictionaryFile)

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 `cmdStr` used to navigate to `object`.

`[cmdStr, titleStr] = rmi('navCmd', object)` returns the MATLAB command `cmdStr` and the title `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('guidget', 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('report', dictionaryFile)` generates a Requirements Traceability report in HTML format for the Simulink data dictionary specified by `dictionaryFile`.

`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('check', dictionaryFile)` checks consistency of traceability links associated with the Simulink data dictionary `dictionaryFile`, 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 `slrequirements` 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.

Examples

Requirements Links Management in Example Model

Get a requirement associated with a block in the `slvnvdemo_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 `slvnvdemo_fuelsys_htmreq` example model.

```
slvnvdemo_fuelsys_htmreq;
blk_with_req =  ['slvnvdemo_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 `slvnvdemo_fuelsys_htmreq` example model.

```
rmi('report', 'slvnvdemo_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>]');
```

Specify a new label template for requirements links to IBM Rational DOORS and set the maximum label length to (for example) 200 characters.

```
rmi('setDoorsLabelTemplate', '%h %200');
```

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);
```

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 character vector 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 character vector 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 character vector 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`

`dictionaryFile` — Simulink data dictionary with requirements traceability associations

character vector

Simulink data dictionary with requirements traceability associations, specified as a character vector containing the file name and, optionally, path of the dictionary.

Example:

Data Types: `char`

`guidStr` — Globally unique identifier for model object

character vector

Globally unique identifier for model object `object`, specified as a character vector.

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 character vector 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

character vector

Example:

Data Types: `char`

`template` — Template label for links to requirements in IBM Rational DOORS

character vector

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

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` Character vector identifying requirements document

`id` Character vector defining location in requirements document. The first character specifies the identifier type:

First Character	Identifier	Example
`?`	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` Character vector describing the requirement

`keywords` Optional character vector supplementing `description`

`reqsys` Character vector identifying the link type registration name; `'other'` for built-in link types

`cmdStr` — Command used to navigate to model object

character vector

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

Example: `rmiobjnavigate('slvnvdemo_fuelsys_officereq.slx', 'GIDa_59e165f5_19fe_41f7_abc1_39c010e46167');`

`titleStr` — Textual description of model object with requirements links
character vector

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

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

`guidStr` — Globally unique identifier for model object
character vector

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

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.

More About

- "Requirements Management Interface Setup"
- "Maintenance of Requirements Links"

See Also

`rmidocrename` | `rmimap.map` | `rmiobjnavigate` | `rmipref` | `rmitag` | `RptgenRMI.doorsAttribs` | `slrequirements`

Introduced in R2006b

rmidata.export

Move requirements traceability data to external `.req` file

Syntax

```
[total_linked,total_links] = rmidata.export
[total_linked,total_links] = rmidata.export(model)
```

Description

`[total_linked,total_links] = rmidata.export` moves requirements traceability data associated with the current Simulink model to an external file named *`model_name`*`.req`. `rmidata.export` saves the file in the same folder as the model. `rmidata.export` deletes the requirements traceability data stored in the model and saves the modified model.

`[total_linked,total_links] = rmidata.export(model)` moves requirements traceability data associated with `model` to an external file named *`model_name`*`.req`. `rmidata.export` saves the file in the same folder as `model`. `rmidata.export` deletes the requirements traceability data stored in the model and saves the modified model.

Input Arguments

`model`

Name or handle of a Simulink model

Output Arguments

`total_linked`

Integer indicating the number of objects in the model that have linked requirements

`total_links`

Integer indicating the total number of requirements links in the model

Examples

Move the requirements traceability data from the `slvnvdemo_fuelsys_officereq` model to an external file:

```
rmidata.export('slvnvdemo_fuelsys_officereq');
```

More About

- "Specify Storage for Requirements Links"
- "Requirements Link Storage"

See Also

`rmi` | `rmidata.save` | `rmimap.map`

Introduced in R2011b

rmimap.map

Associate externally stored requirements traceability data with model

Syntax

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

Description

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

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

`rmimap.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('slvnvdemo_powerwindowController');
reqFile = fullfile(matlabroot, 'toolbox', 'slvnv', ...
    'rmidemos', 'powerwin_reqs', ...
    'slvnvdemo_powerwindowRequirements.req');
rmimap.map('slvnvdemo_powerwindowController', reqFile);
rmi('highlightModel', 'slvnvdemo_powerwindowController');
```

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

```
rmimap.map('slvnvdemo_powerwindowController','clear');
```

More About

- "Specify Storage for Requirements Links"
- "Requirements Link Storage"

See Also

`rmi` | `rmidata.save` | `rmidata.export`

Introduced in R2015a

rmidata.save

Save requirements traceability data in external `.req` file

Syntax

```
rmidata.save(model)
```

Description

`rmidata.save(model)` 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 **Analysis > Requirements > Save Links** in the Simulink Editor.

Examples

Create New Requirement Link and Save Externally

Add a requirement link to an existing example model, and save the model requirements traceability data in an external file.

Open the example model, `slvnvdemo_powerwindowController`.

```
open_system('slvnvdemo_powerwindowController');
```

Specify that the model store requirements data externally.

```
rmipref('StoreDataExternally',1);
```

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\slvnv\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 `slvnvdemo_powerwindowController` example model.

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

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

```
rmidata.save('slvnvdemo_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 `slvnvdemo_powerwindowController` example model.

```
rmi('highlightModel', 'slvnvdemo_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('slvnvdemo_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.

- "Managing Requirements Without Modifying Simulink Model Files"

Input Arguments

`model` — Name or handle of model with requirements links

character vector | handle

Name of model with requirements links, specified as a character vector, or handle to model with requirements links. The model must be loaded into memory and configured to store requirements traceability data externally.

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 `rmipref` command to specify storage settings.

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 `rmidata.export` command to convert existing requirements traceability data to external storage.

Example: `'slvnvdemo_powerwindowController'`

Example: `get_param(gcs,'Handle')`

More About

- "Requirements Link Storage"

See Also

`rmidata.export` | `rmimap.map`

Introduced in R2013b

rmidocrename

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 character vector that contains the existing full or partial file or path name. `new_path` is a character vector 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 character vectors 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 character vector `'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`

Introduced in R2009b

slrequirements

Synchronize model with DOORS surrogate module

Syntax

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

Description

`slrequirements('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.

`slrequirements('doorssync', model_name, settings)` non-interactively synchronizes `model_name` with a DOORS surrogate module using the options that `settings` specifies.

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

`default_settings = slrequirements('doorssync', model_name, [])` returns the default settings for synchronization, but does not synchronize the model with the DOORS surrogate module.

`default_settings = slrequirements('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 `'/PROJECT/FOLDER/MODULE'`.) The default, `'./$ModelName$'`, resolves to the given model name under the current DOORS project.
`saveModel`	Saves the model after synchronization. **Default**: `1`
`saveSurrogate`	Saves the modified surrogate module. **Default**: `1`
`slToDoors`	Copies links from Simulink to the surrogate module. **Default**: `0`
`doorsToSl`	Copies links from the surrogate module to Simulink. If both `doorsToSl` and `slToDoors` are set to `1`, an error occurs. **Default**: `0`
`purgeSimulink`	Removes unmatched links in Simulink (ignored if `doorsToSl` is set to `0`). `slrequirements` ignores `purgeSimulink` if `doorsToSl` is set to `0`. **Default**: `0`

Field	Description
`purgeDoors`	Removes unmatched links in the surrogate module (ignored if `slToDoors` is set to `0`). **Default**: `0`
`detailLevel`	Specifies which objects with no links to DOORS to include in the surrogate module. 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. **Default**: `1`

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 = slrequirements('doorssync','slvnvdemo_fuelsys_officereq', ...
```

```
 'settings');
settings.slToDoors = 1;
setting.purgeDoors = 1;
slrequirements('doorssync','slvnvdemo_fuelsys_officereq', settings);
```

Alternatives

Instead of using `slrequirements`, 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**.

More About

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

See Also

`rmi`

Introduced in R2016a

rmiobjnavigate

Navigate to model objects using unique Requirements Management Interface identifiers

Syntax

```
rmiobjnavigate(modelPath, guId)
rmiobjnavigate(modelPath, guId, grpNum)
```

Description

`rmiobjnavigate(modelPath, guId)` navigates to and highlights the specified object in a Simulink model.

`rmiobjnavigate(modelPath, guId, grpNum)` navigates to the signal group number `grpNum` of a Signal Builder block identified by `guId` in the model `modelPath`.

Input Arguments

`modelPath`

A full path to a Simulink model file, or a Simulink model file name that can be resolved on the MATLAB path.

`guId`

A unique identifier that the RMI uses to identify a Simulink or Stateflow object.

`grpNum`

Integer indicating a signal group number in a Signal Builder block

Examples

Open the `slvnvdemo_fuelsys_officereq` example model and get the unique identifier for the MAP Sensor block:

```
% Open example model
slvnvdemo_fuelsys_officereq;
% Get the Simulink Identifier of the MAP Sensor Block
targetSID = Simulink.ID.getSID('slvnvdemo_fuelsys_officereq/MAP sensor');
```

Navigate to the MAP Sensor block using `rmiobjnavigate` and the unique identifier returned in the previous step:

```
% Split targetSID into two components
[targetModel, targetObj] = strtok(targetSID,':');
% Navigate to the MAP sensor using the model name and model guID
rmiobjectnavigate(targetModel, targetObj)
```

More About

- "Use the rmiobjnavigate Function"

See Also

`rmi`

Introduced in R2010b

rmipref

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.

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 character vector, 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.

Internal Storage of Requirements Traceability Data

Configure the RMI to embed requirements links data in the model file instead of in a separate `.req` 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 embed requirements traceability data in the model file, set the `'StoreDataExternally'` preference to `0`.

```
previousVal = rmipref('StoreDataExternally',0)
```

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 externally in a separate `.req` file, so the previous value of this preference was `1`.

```
previousVal =

     1
```

After you set the `'StoreDataExternally'` preference to `0`, your requirements links are embedded in the model file.

```
currentVal = rmipref('StoreDataExternally')
```

```
currentVal =

     0
```

Input Arguments

`prefName` — RMI preference name

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

RMI preference name, specified as the corresponding `Name` character vector listed in "Name-Value Pair Arguments" on page 1-237.

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 bidirectional 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'` — Bidirectional selection linking preference

`false` (default) | `true`

Bidirectional 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 values.

Value	Document reference contains...
`'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 values.

Value	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 character vector (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 character vector (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 character vector. 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 character vector (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 character vector (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 character vector. 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 1-237.

`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 1-237.

More About

- “Requirements Settings”

See Also

`rmi`

Introduced in R2013a

rmiref.insertRefs

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 character vector 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:

```
slvnvdemo_fuelsys_officereq
```

2 Open the example requirements document:

```
open([matlabroot strcat('/toolbox/slvnv/rmidemos/fuelsys_req_docs/',...
 'slvnvdemo_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`

Introduced in R2011a

rmiref.removeRefs

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 character vector 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`

Introduced in R2011a

rmitag

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 `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`.

Input Arguments

`model`

Name of or handle to Simulink or Stateflow model with which requirements are associated.

`tag`

Character vector specifying user tag for requirements links.

`doc_pattern`

Regular expression to match in the linked requirements document name. Not case sensitive.

`new_tag`

Character vector 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 `slvnvdemo_fuelsys_officereq` example model, and add the user tag `tmptag` to all objects with requirements links:

```
open_system('slvnvdemo_fuelsys_officereq');
rmitag(gcs, 'add', 'tmptag');
```

Remove the user tag `test` from all requirements links:

```
open_system('slvnvdemo_fuelsys_officereq');
rmitag(gcs, 'delete', 'test');
```

Delete all requirements links that have the user tag `design`:

```
open_system('slvnvdemo_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');
```

More About

- "User Tags and Requirements Filtering"

See Also

`rmi` | `rmidocrename`

Introduced in R2010a

RptgenRMI.doorsAttribs

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`

Character vector 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. The default configuration includes the **Object Heading** and **Object Text** attributes, and all other attributes, except: • **Created Thru** • System attributes with empty string values • System attributes that are false
`'show'`	Display the current settings for the DOORS attributes to include in the report.

Value	Description
`'type'`	Include or omit groups of DOORS attributes from the report. If you specify `'type'` for the first argument, valid values for the second argument are: • `'all'` — Include all DOORS attributes in the report. • `'user'` — Include only user-defined DOORS in the report. • `'none'` — Omit all DOORS attributes from the report.
`'remove'`	Omit specified DOORS attributes from the report.
`'all'`	Include specified DOORS attributes in the report, even if that attribute is currently excluded as part of a group.
`'nonempty'`	Enable or disable the empty attribute filter: • Enter `RptgenRMI.doorsAttribs('nonempty', 'off')` to omit all empty attributes from the report. • Enter `RptgenRMI.doorsAttribs('nonempty', 'on')` to include empty user-defined attributes. The report never includes empty system attributes.

Default:

`attribute`

Character vector that qualifies the `action` argument.

Output Arguments

`result`

- True if `RptgenRMI.doorsAttribs` modifies the current settings.
- For `RptgenRMI.doorsAttribs('show')`, this argument is a cell array of character vectors 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`

Introduced in R2011b

run

Class: Advisor.Application
Package: Advisor

Run Model Advisor analysis on model components

Syntax

```
run(app)
```

Description

`run(app)` runs a Model Advisor analysis, as specified by the `Application` object.

Examples

This example shows how to create an `Application` object, set root analysis to `RootModel`, and run a Model Advisor analysis.

```
% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Run Model Advisor analysis
run(app);
```

Input Arguments

app — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot

Introduced in R2015b

selectCheckInstances

Class: Advisor.Application
Package: Advisor

Select check instances to use in Model Advisor analysis

Syntax

```
selectCheckInstances(app)
selectCheckInstances(app,Name,Value)
```

Description

You can select check instances to use in a Model Advisor analysis. A check instance is an instantiation of a `ModelAdvisor.Check` object in the Model Advisor configuration. When you change the Model Advisor configuration, the check instance ID might change. To obtain the check instance ID, use the `getCheckInstanceIDs` method.

`selectCheckInstances(app)` selects all check instances to use for Model Advisor analysis.

`selectCheckInstances(app,Name,Value)` selects check instances specified by `Name,Value` pair arguments to use for Model Advisor analysis.

Input Arguments

app — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

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`.

`'IDs'` — Check instance IDs
cell array

Select check instances to use in Model Advisor analysis, as specified as a cell array of IDs

Data Types: `cell`

Examples

Select All Check Instances to Use in Model Advisor Analysis

This example shows how to set the root model, create an `Application` object, set root analysis, and select all check instances for Model Advisor analysis.

```
% Set root model to sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Select all checks
selectCheckInstances(app);
```

Select Check Instance for Model Advisor Analysis Using Instance ID

This example shows how to set the root model, create an `Application` object, set root analysis, and select a check using instance ID.

```
% Set root model to sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);
```

```
% Select "Identify unconnected lines, input ports, and output
% ports" check using check instance ID
instanceID = getCheckInstanceIDs(app,'mathworks.design.UnconnectedLinesPorts');
checkinstanceID = instanceID(1);
selectCheckInstances(app,'IDs',checkinstanceID);
```

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot | Advisor.Application.getCheckInstanceIDs | Advisor.Application.deselectCheckInstances

Introduced in R2015b

selectComponents

Class: Advisor.Application
Package: Advisor

Select model components for Model Advisor analysis

Syntax

```
selectComponents(app)
selectComponents(app,Name,Value)
```

Description

You can select model components for Model Advisor analysis. A model component is a model in the system hierarchy. Models that the root model references and that `Advisor.Application.setAnalysisRoot` specifies are model components. By default, all components are selected.

`selectComponents(app)` includes all components for Model Advisor analysis.

`selectComponents(app,Name,Value)` includes model components specified by `Name,Value` pair arguments for Model Advisor analysis.

Input Arguments

app — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

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`.

`'IDs'` — Component IDs
cell array

Components to select for Model Advisor analysis, as specified by a cell array of IDs

Data Types: `cell`

`'HierarchicalSelection'` — Select component and component children
false (default) | true

Select components specified by IDs and component children from Model Advisor analysis.

Data Types: `logical`

Examples

Include All Components in Model Advisor Analysis

This example shows how to set the root model, create an `Application` object, set root analysis, and include model components in Model Advisor analysis.

```
% Set root model to  sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Select all components
selectComponents(app);
```

Select Components for Model Advisor Analysis Using IDs

This example shows how to set the root model, create an `Application` object, set root analysis, and include model components using IDs.

```
% Set root model to  sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';
```

```
% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Select component using IDs
selectComponents(app,'IDs',RootModel);
```

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot | Advisor.Application.deselectComponents

Introduced in R2015b

setAction

Class: ModelAdvisor.Check
Package: ModelAdvisor

Specify action for check

Syntax

```
setAction(check_obj, action_obj)
```

Description

`setAction(check_obj, action_obj)` returns the action object `action.obj` to use in the check `check_obj`. The `setAction` method identifies the action you want to use in a check.

See Also

ModelAdvisor.Action | "Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setAlign

Class: ModelAdvisor.Paragraph
Package: ModelAdvisor

Specify paragraph alignment

Syntax

```
setAlign(paragraph, alignment)
```

Description

`setAlign(paragraph, alignment)` specifies the alignment of text. Possible values are:

- `'left'` (default)
- `'right'`
- `'center'`

Examples

```
report_paragraph = ModelAdvisor.Paragraph;
setAlign(report_paragraph, 'center');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setAnalysisRoot

Class: Advisor.Application
Package: Advisor

Specify model hierarchy for Model Advisor analysis

Syntax

```
setAnalysisRoot(app,'Root',root)
setAnalysisRoot(app,'Root',root,Name,Value)
```

Description

Specify the model hierarchy for an `Application` object analysis.

`setAnalysisRoot(app,'Root',root)` specifies the analysis root.

`setAnalysisRoot(app,'Root',root,Name,Value)` specifies the analysis root using `Name,Value` options.

Input Arguments

`app` — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

`'Root',root` — `Name,Value` argument specifying model or subsystem path

character vector

Comma-separated `Name,Value` argument specifying model or subsystem path

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`.

`'RootType'` — Analysis root
`Model` (default) | `Subsystem`

Examples

Specify Root Model as Analysis Root

This example shows how to set the root model, create an `Application` object, and set the root analysis.

```
% Set root model to sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);
```

Specify Subsystem as Analysis Root

This example shows how to set the root model, create an `Application` object, and specify a subsystem as the analysis root.

```
% Set root model to sldemo_mdlref_basic model
RootModel='sldemo_mdlref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root','sldemo_mdlref_basic/CounterA','RootType','Subsystem');
```

See Also
Advisor.Manager.createApplication

Introduced in R2015b

setAnalysisRoot

Class: slmetric.Engine
Package: slmetric

Specify model or subsystem for metric analysis

Syntax

```
setAnalysisRoot(slmetric_obj,'Root',root)
setAnalysisRoot(slmetric_obj,'Root',root,Name,Value)
```

Description

Specify the model or subsystem for `slmetric.Engine` metric object analysis.

`setAnalysisRoot(slmetric_obj,'Root',root)` specifies the metric analysis root.

`setAnalysisRoot(slmetric_obj,'Root',root,Name,Value)` specifies the metric analysis root using `Name,Value` options.

Input Arguments

`slmetric_obj` — Metric engine
`slmetric.Engine` object

`slmetric.Engine` object, created by `slmetric.Engine`.

`'Root',root` — `Name,Value` argument specifying model or subsystem path
character vector

Comma-separated `Name,Value` argument specifying model or subsystem path.

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`.

`'RootType'` — Metric analysis root
`Model` (default) | `Subsystem`

Examples

Specify Model for Metric Analysis

This example shows how to set the root model, create an `slmetric.Engine` object, and specify the model for metric analysis.

```
% Set root model to vdp model
RootModel='vdp';

% Create an slmetric.Engine object
slmetric_obj = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(slmetric_obj,'Root',RootModel);
```

Specify Subsystem for Metric Analysis

This example shows how to set the root model, create an `slmetric.Engine` object, and specify a subsystem for metric analysis.

```
% Set subsystem to CounterA
Subsys ='sf_car/Engine';

% Create an slmetric.Engine object
slmetric_obj = slmetric.Engine();

% Set a subsystem for metric analysis
setAnalysisRoot(slmetric_obj,'Root',Subsys,'RootType','Subsystem');
```

See Also

slmetric.metric.ResultCollection | slmetric.metric.Metric | `slmetric.metric.getAvailableMetrics`

More About

- "Model Metrics Results API" on page 4-2
- "Collect Model Metrics Programmatically"
- "Model Metrics"

Introduced in R2016a

setBold

Class: ModelAdvisor.Text
Package: ModelAdvisor

Specify bold text

Syntax

```
setBold(text, mode)
```

Description

`setBold(text, mode)` specifies whether `text` should be formatted in bold font.

Input Arguments

`text`	Instantiation of the ModelAdvisor.Text class
`mode`	A Boolean value indicating bold formatting of text: • `true` — Format the text in bold font. • `false` — Do not format the text in bold font.

Examples

```
t1 = ModelAdvisor.Text('This is some text');
setBold(t1, 'true');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setCallbackFcn

Class: ModelAdvisor.Action
Package: ModelAdvisor

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, `slvnvdemo_mdladv`. 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(@modifyOptmizationSetting);
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"

- “Create Model Advisor Checks”
- “setActionEnable”

setCallbackFcn

Class: ModelAdvisor.Check
Package: ModelAdvisor

Specify callback function for check

Syntax

```
setCallbackFcn(check_obj, @handle, context, style)
```

Description

`setCallbackFcn(check_obj, @handle, context, style)` specifies the callback function to use with the check, `check_obj`.

Input Arguments

`check_obj`	Instantiation of the `ModelAdvisor.Check` class
`handle`	Handle to a check callback function
`context`	Context for checking the model or subsystem: • `'None'` — No special requirements. • `'PostCompile'` — The model must be compiled.
`style`	Type of callback function: • `'StyleOne'` — Simple check callback function, for formatting results using template • `'StyleTwo'` — Detailed check callback function • `'StyleThree'` — Check callback functions with hyperlinked results

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"
- "Create Model Advisor Checks"

setCheck

Class: ModelAdvisor.Task
Package: ModelAdvisor

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`.

Input Arguments

`task`	Instantiation of the `ModelAdvisor.Task` class
`check_ID`	A unique identifier for the check to use in the task

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');
setCheck(MAT1, 'com.mathworks.sample.Check1');
```

setCheckText

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

Add description of check to result

Syntax

```
setCheckText(ft_obj, text)
```

Description

`setCheckText(ft_obj, text)` 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.

Input Arguments

`ft_obj`

A handle to a template object.

`text`

A character vector or a handle to a formatting object.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

`text` appears as the first line in the analysis result.

Examples

Create a list object, `ft`, and add a line of text to the result:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
setCheckText(ft, ['Identify unconnected lines, input ports,'...
    'and output ports in the model']);
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"
- "Format Check Results"

setColHeading

Class: ModelAdvisor.Table
Package: ModelAdvisor

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`.

Input Arguments

`table`	Instantiation of the `ModelAdvisor.Table` class
`column`	An integer specifying the column number
`heading`	A character vector, 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

- “Create Model Advisor Checks”

setColHeadingAlign

Class: ModelAdvisor.Table
Package: ModelAdvisor

Specify column title alignment

Syntax

```
setColHeadingAlign(table, column, alignment)
```

Description

`setColHeadingAlign(table, column, alignment)` specifies the alignment of the column heading.

Input Arguments

`table`	Instantiation of the `ModelAdvisor.Table` class
`column`	An integer specifying the column number
`alignment`	Alignment of the column heading. *`alignment`* can have one of the following values: • `left` (default) • `right` • `center`

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

- "Create Model Advisor Checks"

setColHeadingValign

Class: ModelAdvisor.Table
Package: ModelAdvisor

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

`table`	Instantiation of the `ModelAdvisor.Table` class
`column`	An integer specifying the column number
`alignment`	Vertical alignment of the column heading. *`alignment`* can have one of the following values: • `top` (default) • `middle` • `bottom`

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

- "Create Model Advisor Checks"

setColor

Class: ModelAdvisor.Text
Package: ModelAdvisor

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`	Color of the text, specified as one of the following formatting options: • `'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');
```

setColSpan

Class: ModelAdvisor.InputParameter
Package: ModelAdvisor

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.

Input Arguments

`input_param`	Instantiation of the `ModelAdvisor.InputParameter` class
`start_col`	A positive integer representing the first column that the input parameter occupies in the layout grid
`end_col`	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]);
```

setColTitles

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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 character vectors 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

- "Create Model Advisor Checks"
- "Format Check Results"

setColWidth

Class: ModelAdvisor.Table
Package: ModelAdvisor

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

`table`	Instantiation of the `ModelAdvisor.Table` class
`column`	An integer specifying column number
`width`	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

- "Create Model Advisor Checks"

setEntries

Class: ModelAdvisor.Table
Package: ModelAdvisor

Set contents of table

Syntax

```
setEntries(content)
```

Description

`setEntries(content)` sets `content` of the table.

Input Arguments

`content`	A 2–D cell array containing the contents of the table. Each item of the cell array must be either a character vector 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

- “Create Model Advisor Checks”

setEntry

Class: ModelAdvisor.Table
Package: ModelAdvisor

Add cell to table

Syntax

```
setEntry(table, row, column, string)
setEntry(table, row, column, content)
```

Description

`setEntry(table, row, column, string)` adds a character vector 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 character vector 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

- "Create Model Advisor Checks"

setEntryAlign

Class: ModelAdvisor.Table
Package: ModelAdvisor

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

`table`	Instantiation of the `ModelAdvisor.Table` class
`row`	An integer specifying row number
`column`	An integer specifying column number
`alignment`	Cell alignment, specified as one of the following: • `'left'` (default) • `'right'` • `'center'`

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

- "Create Model Advisor Checks"

setEntryValign

Class: ModelAdvisor.Table
Package: ModelAdvisor

Specify table cell vertical alignment

Syntax

```
setEntryValign(table, row, column, alignment)
```

Description

`setEntryValign(table, row, column, alignment)` specifies the cell alignment of the designated cell.

Input Arguments

`table`	Instantiation of the `ModelAdvisor.Table` class
`row`	An integer specifying row number
`column`	An integer specifying column number
`alignment`	Cell vertical alignment, specified as one of the following: • `'top'` (default) • `'middle'` • `'bottom'`

Examples

```
table1 = ModelAdvisor.Table(2,3);
setHeading(table1, 'New Table');
.
.
```

```
.
setEntry(table1, 1, 1, 'First Entry');
setEntryValign(table1, 1, 1, 'middle');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setHeading

Class: ModelAdvisor.Table
Package: ModelAdvisor

Specify table title

Syntax

```
setHeading(table, title)
```

Description

`setHeading(table, title)` specifies the table title.

Input Arguments

`table`	Instantiation of the `ModelAdvisor.Table` class
`title`	A character vector, 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

- "Create Model Advisor Checks"

setHeadingAlign

Class: ModelAdvisor.Table
Package: ModelAdvisor

Specify table title alignment

Syntax

```
setHeadingAlign(table, alignment)
```

Description

`setHeadingAlign(table, alignment)` specifies the alignment for the table title.

Input Arguments

`table`	Instantiation of the `ModelAdvisor.Table` class
`alignment`	Table title alignment, specified as one of the following: • `'left'` (default) • `'right'` • `'center'`

Examples

```
table1 = ModelAdvisor.Table(2, 3);
setHeading(table1, 'New Table');
setHeadingAlign(table1, 'center');
```

See Also

"Model Advisor Customization"

How To

- “Create Model Advisor Checks”

setHyperlink

Class: ModelAdvisor.Image
Package: ModelAdvisor

Specify hyperlink location

Syntax

```
setHyperlink(image, url)
```

Description

`setHyperlink(image, url)` specifies the target location of the hyperlink associated with `image`.

Input Arguments

`image`	Instantiation of the `ModelAdvisor.Image` class
`url`	The target URL

Examples

```
matlab_logo=ModelAdvisor.Image;
setHyperlink(matlab_logo, 'http://www.mathworks.com');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setHyperlink

Class: ModelAdvisor.Text
Package: ModelAdvisor

Specify hyperlinked text

Syntax

```
setHyperlink(text, url)
```

Description

`setHyperlink(text, url)` creates a hyperlink from the text to the specified URL.

Input Arguments

`text`	Instantiation of the `ModelAdvisor.Text` class
`url`	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

- "Create Model Advisor Checks"

setImageSource

Class: ModelAdvisor.Image
Package: ModelAdvisor

Specify image location

Syntax

```
setImageSource(image_obj, source)
```

Description

`setImageSource(image_obj, source)` specifies the location of the image.

Input Arguments

`image_obj`	Instantiation of the `ModelAdvisor.Image` class
source	The location of the image file

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setInformation

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

Add description of subcheck to result

Syntax

```
setInformation(ft_obj, text)
```

Description

`setInformation(ft_obj, text)` is an optional method that adds text as the first item after the subcheck title. Use this method to add information describing the subcheck.

Input Arguments

`ft_obj`

A handle to a template object.

`text`

A character vector or a handle to a formatting object, that describes the subcheck.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

The Model Advisor displays *`text`* after the title of the subcheck.

Examples

Create a list object, `ft`, and specify a subcheck title and description:

```
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.']);
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"
- "Format Check Results"

setInputParameters

Class: ModelAdvisor.Check
Package: ModelAdvisor

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`).

Input Arguments

`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

"Model Advisor Customization" | ModelAdvisor.InputParameter

How To

- “Create Model Advisor Checks”

setInputParametersLayoutGrid

Class: ModelAdvisor.Check
Package: ModelAdvisor

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.

Input Arguments

`check_obj`	Instantiation of the `ModelAdvisor.Check` class
`row`	Number of rows in the layout grid
`col`	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

"Model Advisor Customization" | ModelAdvisor.InputParameter

How To

- “Create Model Advisor Checks”

setItalic

Class: ModelAdvisor.Text
Package: ModelAdvisor

Italicize text

Syntax

```
setItalic(text, mode)
```

Description

`setItalic(text, mode)` specifies whether `text` should be italicized.

Input Arguments

`text`	Instantiation of the `ModelAdvisor.Text` class
`mode`	A Boolean value indicating italic formatting of text: • `true` — Italicize the text. • `false` — Do not italicize the text.

Examples

```
t1 = ModelAdvisor.Text('This is some text');
setItalic(t1, 'true');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setListObj

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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

- "Create Model Advisor Checks"
- "Format Check Results"

setRecAction

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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 character vectors 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

- "Create Model Advisor Checks"
- "Format Check Results"

setRefLink

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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 character vectors that you want to display in the result. If you include more than one cell, the Model Advisor displays the character vectors in a bulleted list.

`setRefLink(ft_obj, {{'url', 'standard'}})` generates a list of links in the See Also section. *`url`* 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

- "Create Model Advisor Checks"
- "Format Check Results"

setRetainSpaceReturn

Class: ModelAdvisor.Text
Package: ModelAdvisor

Retain spacing and returns in text

Syntax

```
setRetainSpaceReturn(text, mode)
```

Description

`setRetainSpaceReturn(text, mode)` specifies whether the text must retain the spaces and carriage returns.

Input Arguments

`text`	Instantiation of the `ModelAdvisor.Text` class
`mode`	A Boolean value indicating whether to preserve spaces and carriage returns in the text: • `true` (default) — Preserve spaces and carriage returns. • `false` — Do not preserve spaces and carriage returns.

Examples

```
t1 = ModelAdvisor.Text('MathWorks home page');
setRetainSpaceReturn(t1, 'true');
```

See Also

"Model Advisor Customization"

How To

- “Create Model Advisor Checks”

setRowHeading

Class: ModelAdvisor.Table
Package: ModelAdvisor

Specify table row title

Syntax

```
setRowHeading(table, row, heading)
```

Description

`setRowHeading(table, row, heading)` specifies a title for the designated table row.

Input Arguments

`table`	Instantiation of the `ModelAdvisor.Table` class
`row`	An integer specifying row number
`heading`	A character vector, element object, or object array specifying the table row title

Examples

```
table1 = ModelAdvisor.Table(2,3);
setRowHeading(table1, 1, 'Row 1 Title');
setRowHeading(table1, 2, 'Row 2 Title');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setRowHeadingAlign

Class: ModelAdvisor.Table
Package: ModelAdvisor

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

`table`	Instantiation of the `ModelAdvisor.Table` class
`row`	An integer specifying row number.
`alignment`	Cell alignment, specified as one of the following: • `'left'` (default) • `'right'` • `'center'`

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

- "Create Model Advisor Checks"

setRowHeadingValign

Class: ModelAdvisor.Table
Package: ModelAdvisor

Specify table row title vertical alignment

Syntax

```
setRowHeadingValign(table, row, alignment)
```

Description

`setRowHeadingValign(table, row, alignment)` specifies the vertical alignment for the designated table row.

Input Arguments

`table`	Instantiation of the `ModelAdvisor.Table` class
`row`	An integer specifying row number.
`alignment`	Cell vertical alignment, specified as one of the following: • `'top'` (default) • `'middle'` • `'bottom'`

Examples

```
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');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setRowSpan

Class: ModelAdvisor.InputParameter
Package: ModelAdvisor

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.

Input Arguments

`input_param`	The input parameter object
`start_row`	A positive integer representing the first row that the input parameter occupies in the layout grid
`end_row`	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]);
```

setSubBar

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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

- "Create Model Advisor Checks"
- "Format Check Results"

setSubResultStatus

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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 character vector identifying the status of the check:
`Pass`
`Warn`
`Fail`

Examples

Create a list object, `ft`, and add a passing status:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
setSubResutlStatus(ft, 'Pass');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"
- "Format Check Results"

setSubResultStatusText

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

Add text below status in result

Syntax

```
setSubResultStatusText(ft_obj, message)
```

Description

`setSubResultStatusText(ft_obj, message)` is an optional method that displays text below the status in the result. Use this method to describe the status.

Input Arguments

`ft_obj`

A handle to a template object.

`message`

A character vector or a handle to a formatting object that the Model Advisor displays below the status in the report.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

Examples

Create a list object, `ft`, add a passing status and a description of why the check passed:

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

```
setSubResutlStatus(ft, 'Pass');
setSubResultStatusText(ft, ['Constructs that are not supported when '...
    'generating code were not found in the model or subsystem']);
```

See Also

"Model Advisor Customization"

How To

- "Model Advisor Customization"
- "Format Check Results"

setSubscript

Class: ModelAdvisor.Text
Package: ModelAdvisor

Specify subscripted text

Syntax

```
setSubscript(text, mode)
```

Description

`setSubscript(text, mode)` indicates whether to make `text` subscript.

Input Arguments

`text`	Instantiation of the `ModelAdvisor.Text` class
`mode`	A Boolean value indicating subscripted formatting of text: • `true` — Make the text subscript. • `false` — Do not make the text subscript.

Examples

```
t1 = ModelAdvisor.Text('This is some text');
setSubscript(t1, 'true');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setSuperscript

Class: ModelAdvisor.Text
Package: ModelAdvisor

Specify superscripted text

Syntax

```
setSuperscript(text, mode)
```

Description

`setSuperscript(text, mode)` indicates whether to make `text` superscript.

Input Arguments

`text`	Instantiation of the `ModelAdvisor.Text` class
`mode`	A Boolean value indicating superscripted formatting of text: • `true` — Make the text superscript. • `false` — Do not make the text superscript.

Examples

```
t1 = ModelAdvisor.Text('This is some text');
setSuperscript(t1, 'true');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

setSubTitle

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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 character vector 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

- "Create Model Advisor Checks"
- "Format Check Results"

setTableInfo

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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 character vectors 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

- "Create Model Advisor Checks"

- “Format Check Results”

setTableTitle

Class: ModelAdvisor.FormatTemplate
Package: ModelAdvisor

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 character vector 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

- "Create Model Advisor Checks"
- "Format Check Results"

setType

Class: ModelAdvisor.List
Package: ModelAdvisor

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: • `numbered` • `bulleted`

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

- “Create Model Advisor Checks”

setUnderlined

Class: ModelAdvisor.Text
Package: ModelAdvisor

Underline text

Syntax

```
setUnderlined(text, mode)
```

Description

`setUnderlined(text, mode)` indicates whether to underline `text`.

Input Arguments

`text`	Instantiation of the `ModelAdvisor.Text` class
`mode`	A Boolean value indicating underlined formatting of text: • `true` — Underline the text. • `false` — Do not underline the text.

Examples

```
t1 = ModelAdvisor.Text('This is some text');
setUnderlined(t1, 'true');
```

See Also

"Model Advisor Customization"

How To

- "Create Model Advisor Checks"

sigrangeinfo

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
`BlockPath`	Full path to a model or block
`BlockHandle`	Handle to a model or block
`slObj`	Handle to a Simulink API object
`sfID`	Stateflow ID

Object Specification	Description
`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}`	Cell 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 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** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.

4 Under **Coverage metrics**, select **Signal Range**.

5 On the **Coverage** > **Results** pane, specify the output you need.

6 Click **OK** to close the Configuration Parameters 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 `slvnvdemo_cv_small_controller` model:

```
mdl = 'slvnvdemo_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` | `cvsim` | `conditioninfo` | `decisioninfo` | `getCoverageInfo` | `mcdcinfo` | `overflowsaturationinfo` | `sigsizeinfo` | `tableinfo`

Introduced in R2006b

sigsizeinfo

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
`slObj`	Handle to a Simulink API object
`sfID`	Stateflow ID

Object Specification	Description
`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}`	Cell 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 number of the model component `object`

Output Arguments

`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);
%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 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** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. Under **Coverage metrics**, select **Signal Size**.
5. On the **Coverage** > **Results** pane, specify the output you need.
6. Click **OK** to close the Configuration Parameters dialog box and save your changes.
7. Simulate the model and review the results.

See Also

`complexityinfo` | `cvsim` | `conditioninfo` | `decisioninfo` | `mcdcinfo` | `sigrangeinfo` | `tableinfo`

Introduced in R2010b

slmetric.Engine class

Package: slmetric

Collect metric data on models

Description

Use instances of `slmetric.Engine` to collect metric data on models. This metric data is persistent in the simulation cache folder. Future instantiations of this object, for the same model, can access the cached metric data without generating it again.

Construction

`slmetric_obj = slmetric.Engine` creates a handle to a metric engine object.

Properties

`AnalysisRoot` — Name of root model or subsystem on which to collect metric data

character vector

Name of root model or subsystem on which to collect metric data, as specified by the `slmetric.Engine.setAnalysisRoot` method. This property is read only.

Methods

execute	Generate metric data
getMetrics	Collect model metric data
setAnalysisRoot	Specify model or subsystem for metric analysis
exportMetrics	Export model metrics

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects in the MATLAB documentation.

Examples

Collect Model Metric Data

This example shows how to collect model metric data on `vdp`.

Create an `slmetric.Engine` object and set root analysis.

```
% Set root model to vdp model
RootModel='vdp';

% Create an slmetric.Engine object
slmetric_obj = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(slmetric_obj,'Root',RootModel);
```

Generate and collect model metric data.

```
% Generate and collect model metric data
execute(slmetric_obj);
results = getMetrics(slmetric_obj);
```

See Also

slmetric.metric.Result | slmetric.metric.ResultCollection | `slmetric.metric.getAvailableMetrics`

More About

- "Collect Model Metrics Programmatically"
- Class Attributes
- Property Attributes

Introduced in R2016a

slmetric.metric.getAvailableMetrics

Package: slmetric.metric

Obtain available metrics

Syntax

```
IDs = slmetric.metric.getAvailableMetrics()
[IDs,props] = slmetric.metric.getAvailableMetrics()
```

Description

Obtain available metric IDs using `IDs = slmetric.metric.getAvailableMetrics()`

Obtain available metric IDs and properties using `[IDs,props] = slmetric.metric.getAvailableMetrics()`

Examples

Obtain Available Metric IDs for Model

This example shows how to obtain the available model metric IDs.

```
ID = slmetric.metric.getAvailableMetrics()
```

```
ID =

    'mathworks.metrics.CyclomaticComplexity'
    'mathworks.metrics.DescriptiveBlockNames'
    'mathworks.metrics.LayerSeparation'
    'mathworks.metrics.LibraryLinkCount'
    'mathworks.metrics.MatlabLOCCount'
    'mathworks.metrics.SimulinkBlockCount'
    'mathworks.metrics.StateflowChartObjectCount'
    'mathworks.metrics.StateflowLOCCount'
    'mathworks.metrics.SubSystemCount'
```

```
  'mathworks.metrics.SubSystemDepth'
```

Obtain Available Metrics IDs and Metric Properties

This example shows how to obtain the available model metric properties.

```
[ID,PROPS]=slmetric.metric.getAvailableMetrics()
```

```
ID =

    'mathworks.metrics.CyclomaticComplexity'
    'mathworks.metrics.DescriptiveBlockNames'
    'mathworks.metrics.LayerSeparation'
    'mathworks.metrics.LibraryLinkCount'
    'mathworks.metrics.MatlabLOCCount'
    'mathworks.metrics.SimulinkBlockCount'
    'mathworks.metrics.StateflowChartObjectCount'
    'mathworks.metrics.StateflowLOCCount'
    'mathworks.metrics.SubSystemCount'
    'mathworks.metrics.SubSystemDepth'


PROPS =

1x10 struct array with fields:

    Description
    IsBuiltIn
    Version
```

Output Arguments

`IDs` — Metric IDs

cell array

Metric IDs, returned as a cell array of IDs.

`props` — Metric properties

structure array

Metric properties, returned as a structure array with the following fields:

Description	Description of the metric algorithm.

IsBuiltIn	Boolean indicating if the metric ships with Simulink Verification and Validation™.
Version	Metric algorithm version.

Data Types: `struct`

See Also

slmetric.Engine | slmetric.metric.Result | slmetric.metric.ResultCollection

Introduced in R2016a

slmetric.metric.Result class

Package: slmetric.metric

Metrics for specified model component and metric algorithm

Description

Instances of `slmetric.metric.Result` contain the metric data for a specified model component and metric algorithm.

Construction

`slmetric_result_obj = slmetric.metric.Result` creates a handle to a metric results object.

Properties

`ComponentID` — Component ID

character vector

Unique identifier of the component object for which the metric is calculated. Use `ComponentID` to trace the metric object to the generated metric results for the object. Set the `ComponentID` or `ComponentPath` properties by using the slmetric.metric.Metric.algorithm method.

This property is read/write.

Data Types: `char`

`ComponentPath` — Component path

character vector

Component path for which metric is calculated. Use `ComponentPath` as an alternative to setting the `ComponentID` property. The metric engine converts the `ComponentPath` to a `ComponentID`. Set the `ComponentID` or `ComponentPath` properties by using the slmetric.metric.Metric.algorithm method.

This property is read/write.

Data Types: `char`

`MetricID` — Metric ID
character vector

Metric ID, as specified by the `slmetric.Engine.getMetrics` method.

This property is read/write.

Data Types: `char`

`Value` — Metric value
double (default)

Metric scalar value, generated by the algorithm for the metric specified by `MetricID` and the component specified by `ComponentID`.

This property is read/write.

Data Types: `double`

`AggregatedValue` — Aggregated metric value
double (default)

Metric value aggregated across the model hierarchy. The metric engine implicitly aggregates the metric values. Do not set this property.

This property is read only.

Data Types: `double`

`Measures` — Metric measures
double array

Metric measures, optionally specified by the metric algorithm. Metric measures contain detailed information about the metric value. For example, for a metric that counts the number of blocks per subsystem, you could specify measures that contain the number of virtual and nonvirtual blocks. The metric value is the sum of the virtual and nonvirtual block count.

Set the property using the `slmetric.metric.Metric.algorithm` method. This property is read/write.

Data Types: `double`

`AggregatedMeasures` — Aggregated metric measures

double array

Metric measures value aggregated across the model hierarchy. The metric engine implicitly aggregates the metric measure values. Do not set this property.

This property is read only.

Data Types: `double`

`UserData` — User data

character vector

User data optionally provided by the metric algorithm.

This property is read/write.

Data Types: `char`

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects in the MATLAB documentation.

Examples

Access Metric Results

This example shows how to access metrics for model `vdp`.

Create a `slmetric.Engine` object, set the analysis root, and collect metrics for model `vdp`.

```
% Create an slmetric.Engine object
slmetric_obj = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(slmetric_obj,'Root','vdp','RootType','Model');
```

```
% Generate and collect model metrics
execute(slmetric_obj);
rc = getMetrics(slmetric_obj);
```

Display the metric result `MetricID`, `ComponentPath`, and `Value`.

```
for n=1:length(rc)
    if rc(n).Status == 0
        results = rc(n).Results;

        for m=1:length(results)
            disp(['MetricID: ',results(m).MetricID]);
            disp(['  ComponentPath: ', results(m).ComponentPath]);
            disp(['  Value: ', num2str(results(m).Value)]);
        end
    else
        disp(['No results for:', rc(n).MetricID]);
    end
    disp(' ');
end
```

See Also

slmetric.Engine | slmetric.metric.Metric | slmetric.metric.ResultCollection

More About

- "Model Metrics Results API" on page 4-2
- "Collect Model Metrics Programmatically"
- "Model Metrics"
- Class Attributes
- Property Attributes

Introduced in R2016a

slmetric.metric.ResultCollection class

Package: slmetric.metric

Metric data for specified model metric

Description

Instances of `slmetric.metric.ResultCollection` contain the metric data for a specific model metric.

Construction

`slmetric_rescol_obj = slmetric.metric.ResultCollection` creates a handle to a metric result collection object.

Properties

`MetricID` — Metric ID

character vector

Metric ID, as specified in the metric algorithm. This property is read only.

`Status` — Unique identifier

integer

Status code of metric execution. This property is read only.

Integer	Status
1	No result. Metric algorithm is not applicable to the analyzed system. Components analyzed by the metric not found, or metric with compile requirement cannot be executed on library model.
0	Result collected.
-1	No result. Error executing metric.
-2	No result available from previous run.

Integer	Status
-3	No result. Compilation error.

`Results` — Array of `slmetric.metric.Result` objects

false (default) | true

Array of `slmetric.metric.Result` objects. This property is read only.

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects in the MATLAB documentation.

See Also

slmetric.Engine | slmetric.metric.Result | `slmetric.metric.getAvailableMetrics`

More About

- Class Attributes
- Property Attributes

Introduced in R2016a

slvnvextract

Extract subsystem or subchart contents into new model

Syntax

```
newModel = slvnvextract(subsystem)
newModel = slvnvextract(subchart)
newModel = slvnvextract(subsystem, showModel)
newModel = slvnvextract(subchart, showModel)
```

Description

`newModel = slvnvextract(subsystem)` extracts the contents of the Atomic Subsystem block `subsystem` and creates a new model. `slvnvextract` returns the name of the new model in `newModel`. `slvnvextract` uses the subsystem name for the model name, appending a numeral to the model name if that model name already exists.

`newModel = slvnvextract(subchart)` extracts the contents of the atomic subchart `subchart` and creates a new model. `subchart` should specify the full path of the atomic subchart. `slvnvextract` uses the subchart name for the model name, appending a numeral to the model name if that model name already exists.

Note: If the atomic subchart calls an exported graphical function that is outside the subchart, `slvnvextract` creates the model, but the new model will not compile.

`newModel = slvnvextract(subsystem, showModel)` and `newModel = slvnvextract(subchart, showModel)` open the extracted model if you set `showModel` to `true`. The extracted model is only loaded if `showModel` is set to `false`.

Input Arguments

`subsystem`

Full path to the atomic subsystem

`subchart`

Full path to the atomic subchart

`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_mdlref_conversion` model and copy it into a new model:

```
open_system('sldemo_mdlref_conversion');
newmodel = slvnvextract('sldemo_mdlref_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);
```

Introduced in R2010b

slvnvharnessopts

Generate default options for `slvnvmakeharness`

Syntax

```
harnessopts = slvnvharnessopts
```

Description

`harnessopts = slvnvharnessopts` 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
`harnessFilePath`	Specifies the file path for creating the harness model. If an invalid path is specified, `slvnvmakeharness` does not save the harness model, but it creates and opens the harness model. If this option is not specified, `slvnvmakeharness` generates a new harness model and saves it in the MATLAB current folder. Default: `''`
`modelRefHarness`	Generates the test harness model that includes `model` in a Model block. When `false`, the test harness model includes a copy of `model`. Default: `true`

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 `model` must be compatible with the Simulink Design Verifier software to detect the used input signals. Default: `false`

Examples

Create a test harness for the `sldemo_mdlref_house` model using the default options:

```
open_system('sldemo_mdlref_house');
harnessOpts = slvnvharnessopts;
[harnessfile] = slvnvmakeharness('sldemo_mdlref_house',...
      '', harnessOpts);
```

See Also

`slvnvmakeharness`

Introduced in R2010b

slvnvlogsignals

Log test data for component or model during simulation

Syntax

```
data = slvnvlogsignals(model_block)
data = slvnvlogsignals(harness_model)
data = slvnvlogsignals(harness_model, test_case_index)
```

Description

`data = slvnvlogsignals(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. `slvnvlogsignals` records the logged data in the structure `data`.

`data = slvnvlogsignals(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 `slvnvmakeharness`.

`data = slvnvlogsignals(harness_model, test_case_index)` simulates every test case in the Signal Builder block of the `harness_model` specified by `test_case_index`. `slvnvlogsignals` logs the input signals to the Test Unit block in the harness model. If you omit `test_case_index`, `slvnvlogsignals` 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 `slvnvmakeharness` creates

`test_case_index`

Array of integers that specifies which test cases in the Signal Builder block of the harness model to simulate

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_mdlref_counter` model, in the context of the `sldemo_mdlref_basic` model and log the data:

   ```
   open_system('sldemo_mdlref_basic');
   data = slvnvlogsignals('sldemo_mdlref_basic/CounterB');
   ```

2. Create a harness model for `sldemo_mdlref_counter` using the logged data and the default harness options:

   ```
   load_system('sldemo_mdlref_counter');
   harnessOpts = slvnvharnessopts
   [harnessFilePath]  = ...
       slvnvmakeharness('sldemo_mdlref_counter', data, ...
       harnessOpts);
   ```

See Also

`sldvmakeharness` | `slvnvruncgvtest` | `slvnvruntest` | `slvnvmakeharness`

Introduced in R2010b

slvnvmakeharness

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 character vector 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. The default `dataFile` argument creates a test harness with a single test case with default values for the inputs.

Input Arguments

`model`

Handle to a Simulink model or a character vector with the model name

`dataFile`

Refers to a structure created by the `slvnvlogsignals` or the `slvnvmergedata` functions. It contains information about the model, its input and output ports, and any

preexisting test signals. This argument can either be the structure itself or the name of the `.mat` file containing this structure. Use this parameter when you have previously logged test data that you wish to import into a new test harness.

Default: `''`

`harnessOpts`

A structure whose fields specify the configuration for `slvnvmakeharness`:

Field	Description
`harnessFilePath`	Specifies the file path for creating the harness model. If an invalid path is specified, `slvnvmakeharness` does not save the harness model, but it creates and opens the harness model. If this option is not specified, the `slvnvoptions` object is used. If this option is not specified, `slvnvmakeharness` generates a new harness model and saves it in the MATLAB current folder. Default: `''`
`modelRefHarness`	Generates the test harness model that includes `model` in a Model block. When `false`, the test harness model includes a copy of `model`. Default: `true` **Note:** If your model contains bus objects and you set `modelRefHarness` to `true`, in the **Configuration Parameters** > **Diagnostics** > **Connectivity** pane, you must set the **Mux blocks used to create bus signals** parameter to `error`. For more information, see "Prevent Bus and Mux Mixtures".
`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 `model` must be compatible with the Simulink Design Verifier software to detect the used input signals.

Field	Description
	Default: `false`

Note: To create a default `harnessOpts` object, at the MATLAB command prompt, type:

```
slvnvharnessopts
```

Output Arguments

`harnessFilePath`

Character vector containing the path and file name of the generated harness model

Examples

Create a test harness for the `sldemo_mdlref_house` model using the default options:

```
open_system('sldemo_mdlref_house');
[harnessfile] = slvnvmakeharness('sldemo_mdlref_house', '', harnessOpts);
```

See Also

`slvnvharnessopts` | `slvnvmergeharness`

Introduced in R2010b

slvnvmergedata

Combine test data from data files

Syntax

```
merged_data = slvnvmergedata(data1,data2,...)
```

Description

`merged_data = slvnvmergedata(data1,data2,...)` combines two or more test cases and counterexamples `data` into a single test case data structure `merged_data`.

Input Arguments

`data`

Structure that contains test case or counterexample data. Generate this structure by running `slvnvlogsignals`, or by running a Simulink Design Verifier analysis.

Output Arguments

`merged_data`

Structure that contains the merged test cases or counterexamples

Examples

Open the `sldemo_mdlref_basic` model, which contains three Model blocks that reference the model `sldemo_mdlref_counter`. Log the input signals to the three Model blocks and merge the logged data using `slvnvmergedata`. Simulate the referenced model, `sldemo_mdlref_counter`, for coverage with the merged data and display the coverage results in an HTML file.

```
sldemo_mdlref_basic;
data1 = slvnvlogsignals('sldemo_mdlref_basic/CounterA');
data2 = slvnvlogsignals('sldemo_mdlref_basic/CounterB');
data3 = slvnvlogsignals('sldemo_mdlref_basic/CounterC');
merged_data = slvnvmergedata(data1, data2, data3);
open_system('sldemo_mdlref_counter');
runOpts = slvnvruntestopts;
runOpts.coverageEnabled = true;
[ outData, initialCov ] = slvnvruntest('sldemo_mdlref_counter', ...
     merged_data, runOpts);
cvhtml('Initial coverage', initialCov);
```

See Also

slvnvlogsignals | slvnvmakeharness | slvnvruncgvtest | slvnvruntest | sldvrun

Introduced in R2011a

slvnvmergeharness

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`. `slvnvharnessmerge` saves the data and initialization commands in `name`, which is a handle to the new model.

`initialization_commands` is a cell array of character vectors 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

Default:

`models`

A cell array of character vectors that represent harness model names

`initialization_commands`

A cell array of character vectors 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_mdlref_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_mdlref_basic');
data1 = slvnvlogsignals('sldemo_mdlref_basic/CounterA');
data2 = slvnvlogsignals('sldemo_mdlref_basic/CounterB');
data3 = slvnvlogsignals('sldemo_mdlref_basic/CounterC');
open_system('sldemo_mdlref_counter');
harness1FilePath = slvnvmakeharness('sldemo_mdlref_counter', data1);
harness2FilePath = slvnvmakeharness('sldemo_mdlref_counter', data2);
harness3FilePath = slvnvmakeharness('sldemo_mdlref_counter', data3)
[~, harness1] = fileparts(harness1FilePath);
[~, harness2] = fileparts(harness2FilePath);
[~, harness3] = fileparts(harness3FilePath);
slvnvmergeharness('new_harness_model',{harness1, harness2, harness3});
```

See Also

`slvnvlogsignals` | `slvnvmakeharness`

Introduced in R2010b

slvnvruncgvtest

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`.

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 `slvnvlogsignals` function.

`runOpts`

A structure whose fields specify the configuration of `slvnvruncgvtest`.

Field Name	Description
`testIdx`	Test case index array to simulate from `dataFile`. If `testIdx = []` (the default), `slvnvruncgvtest` simulates all test cases.
`allowCopyModel`	Specifies to create and configure the model if you have not configured it for executing test cases with the CGV API. If `true` and you have not configured your `model` to execute test cases with the CGV API, `slvnvruncgvtest` copies the model, fixes the configuration, and executes the test cases on the copied model. If `false` (the default), an error occurs if the tests cannot execute with the CGV API. **Note:** If you have not configured the top-level model or any referenced models to execute test cases, `slvnvruncgvtest` does not copy the model, even if `allowCopyModel` is `true`. An error occurs.
`cgvCompType`	Defines the software-in-the-loop (SIL) or processor-in-the-loop (PIL) approach for CGV: • `'topmodel'` (default) • `'modelblock'`
`cgvConn`	Specifies mode of execution for CGV: • `'sim'` (default) • `'sil'` • `'pil'`

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
`yout_slvnvruncgvtest`	Output signal data
`logsout_slvnvruncgvtest`	Signal logging data for: • Signals connected to outports • Signals that are configured for logging on the model

Examples

Open the `sldemo_mdlref_basic` example model and log the input signals to the CounterA Model block.

```
open_system('sldemo_mdlref_basic');
load_system('sldemo_mdlref_counter');
loggedData = slvnvlogsignals('sldemo_mdlref_basic/CounterA');
```

Create the default configuration object for `slvnvruncgvtest`, 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 `slvnvruncgvtest`—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 = slvnvruncgvtest('sldemo_mdlref_counter', loggedData, runOpts);
runOpts.cgvConn = 'sil';
```

```
cgvObjectSil = slvnvruncgvtest('sldemo_mdlref_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);
fprintf('\nTest Case:  %d Signals match, %d Signals mismatch', ...
        length(matchNames), length(mismatchNames));
```

More About

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.

See Also

cgv.CGV | `slvnvlogsignals` | `slvnvruntest` | `slvnvruntestopts`

Introduced in R2010b

slvnvruntest

Simulate model using input data

Syntax

```
outData = slvnvruntest(model, dataFile)
outData = slvnvruntest(model, dataFile, runOpts)
[outData, covData] = slvnvruntest(model, dataFile, runOpts)
```

Description

`outData = slvnvruntest(model, dataFile)` simulates `model` using all the test cases in `dataFile`. `outData` is an array of `Simulink.SimulationOutput class` objects. Each array element contains the simulation output data of the corresponding test case.

`outData = slvnvruntest(model, dataFile, runOpts)` simulates `model` using all the test cases in `dataFile`. `runOpts` defines the options for simulating the test cases.

`[outData, covData] = slvnvruntest(model, dataFile, runOpts)` simulates `model` using the test cases in `dataFile`. When the `runOpts` field `coverageEnabled` is `true`, the Simulink Verification and Validation software collects model coverage information during the simulation. `slvnvruntest` returns the coverage data in the `cvdata` object `covData`.

Input Arguments

`model`

Name or handle of the Simulink model to simulate

`dataFile`

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 `slvnvlogsignals` function.

runOpts

A structure whose fields specify the configuration of `slvnvruntest`.

Field	Description
`testIdx`	Test case index array to simulate from `dataFile`. If `testIdx` is `[]`, `slvnvruntest` simulates all test cases. **Default:** `[]`
`coverageEnabled`	If `true`, specifies that the Simulink Verification and Validation software collect model coverage data during simulation. **Default:** `false`
`coverageSetting`	`cvtest` object for collecting model coverage. If `[]`, `slvnvruntest` uses the existing coverage settings for `model`. **Default:** `[]`

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_slvnvruntest`	Simulation time
`xout_slvnvruntest`	State data
`yout_slvnvruntest`	Output signal data
`logsout_slvnvruntest`	Signal logging data for: • Signals connected to outports • Signals that are configured for logging on the model

covData

`cvdata` object that contains the model coverage data collected during simulation.

Examples

Analyze the `sldemo_mdlref_basic` model and log the input signals to the CounterA Model block:

```
open_system('sldemo_mdlref_basic');
loggedData = slvnvlogsignals('sldemo_mdlref_basic/CounterA');
```

Using the logged signals, simulate the model referenced in the Counter block (`sldemo_mdlref_counter`):

```
runOpts = slvnvruntestopts;
runOpts.coverageEnabled = true;
open_system('sldemo_mdlref_counter');
[ outData ] = slvnvruntest('sldemo_mdlref_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('logsout_slvnvruntest')});
Simulink.sdi.view;
```

More About

Tips

The `dataFile` that you create with a Simulink Design Verifier analysis or by running `slvnvlogsignals` 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 `dataFile` 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.

See Also

`cvsim` | `cvtest` | `sim` | `slvnvruntestopts`

Introduced in R2010b

slvnvruntestopts

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
`testIdx`	Test case index array to simulate or execute from data file. If `testIdx` = `[]`, all test cases are simulated or executed. **Default:** `[]`
`coverageEnabled`	Available only for `slvnvruntest`. If `true`, `slvnvruntest` collects model coverage data during simulation. **Default:** `false`

Field Name	Description
`coverageSetting`	Available only for `slvnvruntest`. `cvtest` object to use for collecting model coverage. If `coverageSetting` is `[]`, `slvnvruntest` uses the coverage settings for the model specified in the call to `slvnvruntest`. **Default:** `[]`
`allowCopyModel`	Available only for `slvnvruncgvtest`. Specifies to create and configure the model if you have not configured it to execute test cases with the CGV API. If `true` and you have not configured the model to execute test cases with the CGV API, `slvnvruncgvtest` copies the model, fixes the configuration, and executes the test cases on the copied model. If `false`, an error occurs if the tests cannot execute with the CGV API. **Note:** If you have not configured the top-level model or any referenced models to execute test cases, `slvnvruncgvtest` does not copy the model, even if `allowCopyModel` is `true`. An error occurs. **Default:**`false`
`cgvCompType`	Available only for `slvnvruncgvtest`. Defines the software-in-the-loop (SIL) or processor-in-the-loop (PIL) approach for CGV: • `'topmodel'` • `'modelblock'` **Default:**`'topmodel'`

Field Name	Description
cgvConn	Available only for slvnvruncgvtest. Specifies mode of execution for CGV: • 'sim' • 'sil' • 'pil' **Default:** 'sim'

Examples

Create runOpts objects for slvnvruntest and slvnvruncgvtest:

```
%Create options for slvnvruntest
runtest_opts = slvnvruntestopts;
%Create options for slvnvruncgvtest
runcgvtest_opts = slvnvruntestopts('cgv')
```

Alternatives

Create a runOpts object at the MATLAB command line.

See Also

slvnvruncgvtest | slvnvruntest

Introduced in R2010b

slwebview_cov

Export Simulink models to Web views with coverage

Syntax

```
filename = slwebview_cov(sysname)
filename = slwebview_cov(sysname,Name,Value)
```

Description

`filename = slwebview_cov(sysname)` exports the system `sysname` and its children to a web page `filename` with contextual coverage information for the system displayed on a separate panel of the layered model structure Web view.

`filename = slwebview_cov(sysname,Name,Value)` uses additional options specified by one or more `Name,Value` pair arguments.

Note: You can use `slwebview_cov` only if you have also installed Simulink Report Generator™.

Examples

Export All Layers

Export all the layers (including libraries and masks) from the system `gcs` to the file `filename`

```
filename = slwebview_cov(gcs, 'LookUnderMasks', 'all', 'FollowLinks', 'on')
```

Input Arguments

`sysname` — The system to export to a Web view file

character vector containing the path to the system | handle to a subsystem or block diagram | handle to a chart or subchart

Exports the specified system or subsystem and its child systems to a Web view file, with contextual coverage information for the system displayed on a separate panel of the layered model structure Web view. By default, child systems of the `sysname` system are also exported. Use the `SearchScope` name-value pair to export other systems, in relation to `sysname`.

Example: 'sysname'

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:

`'SearchScope'` — Systems to export, relative to the `sysname` system

`'CurrentAndBelow'` (default) | `'Current'` | `'CurrentAndAbove'` | `'All'`

`'CurrentAndBelow'` exports the Simulink system or the Stateflow chart specified by `sysname` and all systems or charts that it contains.

`'Current'` exports only the Simulink system or the Stateflow chart specified by `sysname`.

`'CurrentAndAbove'` exports the Simulink system or the Stateflow chart specified by the `sysname` and all systems or charts that contain it.

`'All'` exports all Simulink systems or Stateflow charts in the model that contains the system or chart specified by `sysname`.

Data Types: `char`

`'LookUnderMasks'` — Specifies whether to export the ability to interact with masked blocks

`'none'` (default) | `'all'`

`'none'` does not export masked blocks in the Web view. Masked blocks are included in the exported systems, but you cannot access the contents of the masked blocks.

`'all'` exports all masked blocks.

Data Types: `char`

`'FollowLinks'` — Specifies whether to follow links into library blocks
`'off'` (default) | `'on'`

`'off'` does not allow you to follow links into library blocks in a Web view.

`'on'` allows you to follow links into library blocks in a Web view.

Data Types: `char`

`'FollowModelReference'` — Specifies whether to access referenced models in a Web view
`'off'` (default) | `'on'`

`'off'` does not allow you to access referenced models in a Web view.

`'on'` allows you to access referenced models in a Web view.

Data Types: `char`

`'ViewFile'` — Specifies whether to display the Web view in a Web browser when you export the Web view
`'on'` (default) | `'off'`

`'on'` displays the Web view in a Web browser when you export the Web view.

`'off'` does not display the Web view in a Web browser when you export the Web view.

Data Types: `char`

`'ShowProgressBar'` — Specifies whether to display the status bar when you export a Web view
'on' (default) | 'off'

`'on'` displays the status bar when you export a Web view.

`'off'` does not display the status bar when you export a Web view.

Data Types: `char`

`'CovData'` — `cvdata` objects to use
cvdata

The coverage data to use, specified as the comma-separated pair consisting of `'CovData'` and the `cvdata` objects to use.

Example: `'CovData', covdata`

Output Arguments

`filename` — The name of the HTML file for displaying the Web view

character vector

Reports the name of the HTML file for displaying the Web view. Exporting a Web view creates the supporting files, in a folder.

More About

Tips

A Web view is an interactive rendition of a model that you can view in a Web browser. You can navigate a Web view hierarchically to examine specific subsystems and to see properties of blocks and signals.

You can use Web views to share models with people who do not have Simulink installed.

Web views require a Web browser that supports Scalable Vector Graphics (SVG).

See Also

`slwebview_req`

Introduced in R2015a

slwebview_req

Export Simulink system to Web views with requirements

Syntax

```
filename = slwebview_req(sysname)
filename = slwebview_req(sysname,Name,Value)
```

Description

`filename = slwebview_req(sysname)` exports the system `sysname` and its children to a web page `filename` with contextual requirements information for the system displayed on a separate panel of the layered model structure Web view.

`filename = slwebview_req(sysname,Name,Value)` uses additional options specified by one or more `Name,Value` pair arguments.

Note: You can use `slwebview_req` only if you have also installed Simulink Report Generator.

Examples

Export All Layers

Export all the layers (including libraries and masks) from the system `gcs` to the file `filename`

```
filename = slwebview_req(gcs, 'LookUnderMasks', 'all', 'FollowLinks', 'on')
```

Input Arguments

`sysname` — The system to export to a Web view file

character vector containing the path to the system | handle to a subsystem or block diagram | handle to a chart or subchart

Exports the specified system or subsystem and its child systems to a Web view file, with contextual requirements information for the system displayed on a separate panel of the layered model structure Web view. By default, child systems of the `sysname` system are also exported. Use the `SearchScope` name-value pair to export other systems, in relation to `sysname`.

Example: 'sysname'

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:

`'SearchScope'` — Systems to export, relative to the `sysname` system

`'CurrentAndBelow'` (default) | `'Current'` | `'CurrentAndAbove'` | `'All'`

`'CurrentAndBelow'` exports the Simulink system or the Stateflow chart specified by `sysname` and all systems or charts that it contains.

`'Current'` exports only the Simulink system or the Stateflow chart specified by `sysname`.

`'CurrentAndAbove'` exports the Simulink system or the Stateflow chart specified by the `sysname` and all systems or charts that contain it.

`'All'` exports all Simulink systems or Stateflow charts in the model that contains the system or chart specified by `sysname`.

Data Types: `char`

`'LookUnderMasks'` — Specifies whether to export the ability to interact with masked blocks

`'none'` (default) | `'all'`

`'none'` does not export masked blocks in the Web view. Masked blocks are included in the exported systems, but you cannot access the contents of the masked blocks.

`'all'` exports all masked blocks.

Data Types: `char`

`'FollowLinks'` — Specifies whether to follow links into library blocks
`'off'` (default) | `'on'`

`'off'` does not allow you to follow links into library blocks in a Web view.

`'on'` allows you to follow links into library blocks in a Web view.

Data Types: `char`

`'FollowModelReference'` — Specifies whether to access referenced models in a Web view
`'off'` (default) | `'on'`

`'off'` does not allow you to access referenced models in a Web view.

`'on'` allows you to access referenced models in a Web view.

Data Types: `char`

`'ViewFile'` — Specifies whether to display the Web view in a Web browser when you export the Web view
`'on'` (default) | `'off'`

`'on'` displays the Web view in a Web browser when you export the Web view.

`'off'` does not display the Web view in a Web browser when you export the Web view.

Data Types: `char`

`'ShowProgressBar'` — Specifies whether to display the status bar when you export a Web view
'on' (default) | 'off'

`'on'` displays the status bar when you export a Web view.

`'off'` does not display the status bar when you export a Web view.

Data Types: `char`

Output Arguments

`filename` — The name of the HTML file for displaying the Web view
character vector

Reports the name of the HTML file for displaying the Web view. Exporting a Web view creates the supporting files, in a folder.

More About

Tips

A Web view is an interactive rendition of a model that you can view in a Web browser. You can navigate a Web view hierarchically to examine specific subsystems and to see properties of blocks and signals.

You can use Web views to share models with people who do not have Simulink installed.

Web views require a Web browser that supports Scalable Vector Graphics (SVG).

See Also

`slwebview_cov`

Introduced in R2015a

tableinfo

Retrieve lookup table coverage information from `cvdata` object

Syntax

```
coverage = tableinfo(cvdo, object)
coverage = tableinfo(cvdo, object, ignore_descendants)
[coverage, exeCounts] = tableinfo(cvdo, object)
[coverage, exeCounts, brkEquality] = tableinfo(cvdo, object)
```

Description

`coverage = tableinfo(cvdo, object)` returns lookup table coverage results from the `cvdata` object `cvdo` for the model component `object`.

`coverage = tableinfo(cvdo, object, ignore_descendants)` returns lookup table coverage results for `object`, depending on the value of `ignore_descendants`.

`[coverage, exeCounts] = tableinfo(cvdo, object)` returns lookup table coverage results and the execution count for each interpolation/extrapolation interval in the lookup table block `object`.

`[coverage, exeCounts, brkEquality] = tableinfo(cvdo, object)` returns lookup table coverage results, the execution count for each interpolation/extrapolation interval, and the execution counts for breakpoint equality.

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`

Full path or handle to a lookup table block or a model containing a lookup table block.

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:

`covered_intervals`	Number of interpolation/extrapolation intervals satisfied for `object`
`total_intervals`	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 `slvnvdemo_cv_small_controller` model and determine the percentage of interpolation/extrapolation intervals coverage collected for the Gain Table block in the Gain subsystem:

```
mdl = 'slvnvdemo_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 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** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
4. Under **Coverage metrics**, select **Lookup Table**.
5. On the **Coverage** > **Results** pane, specify the output you need.
6. Click **OK** to close the Configuration Parameters dialog box and save your changes.
7. Simulate the model and review the results.

More About

- "Lookup Table Coverage"

See Also

`complexityinfo` | `cvsim` | `conditioninfo` | `decisioninfo` | `getCoverageInfo` | `mcdcinfo` | `overflowsaturationinfo` | `sigrangeinfo` | `sigsizeinfo`

Introduced in R2006b

Attributes property

Class: ModelAdvisor.ListViewParameter
Package: ModelAdvisor

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
```

CallbackContext property

Class: ModelAdvisor.Check
Package: ModelAdvisor

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.

CallbackHandle property

Class: ModelAdvisor.Check
Package: ModelAdvisor

Callback function handle for check

Values

Function handle.

An empty handle `[ ]` is the default.

Description

The `CallbackHandle` property specifies the handle to the check callback function.

CallbackStyle property

Class: ModelAdvisor.Check
Package: ModelAdvisor

Callback function type

Values

`'StyleOne'` (default)
`'StyleTwo'`
`'StyleThree'`

Description

The `CallbackStyle` property specifies the type of the callback function.

`'StyleOne'`	Simple check callback function
`'StyleTwo'`	Detailed check callback function
`'StyleThree'`	Check callback function with hyperlinked results

EmitInputParametersToReport property

Class: ModelAdvisor.Check
Package: ModelAdvisor

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

Data property

Class: ModelAdvisor.ListViewParameter
Package: ModelAdvisor

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')';
```

Description property

Class: ModelAdvisor.Action
Package: ModelAdvisor

Message in **Action** box

Values

Character vector

Default:' ' (empty character vector)

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';
```

Description property

Class: ModelAdvisor.FactoryGroup
Package: ModelAdvisor

Description of folder

Values

Character vector

Default: `''` (empty character vector)

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';
```

Description property

Class: ModelAdvisor.Group
Package: ModelAdvisor

Description of folder

Values

Character vector

Default: `''` (empty character vector)

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';
```

Description property

Class: ModelAdvisor.InputParameter
Package: ModelAdvisor

Description of input parameter

Values

Character vector.

Default: `''` (empty character vector)

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';
```

Description property

Class: ModelAdvisor.Task
Package: ModelAdvisor

Description of task

Values

Character vector

Default: `''` (empty character vector)

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.'
```

DisplayName property

Class: ModelAdvisor.FactoryGroup
Package: ModelAdvisor

Name of folder

Values

Character vector

Default:`' '` (empty character vector)

Description

The `DisplayName` specifies the name of the folder that is displayed in the Model Advisor.

Examples

```
% --- sample factory group
rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');
rec.DisplayName='Sample Factory Group';
```

DisplayName property

Class: ModelAdvisor.Group
Package: ModelAdvisor

Name of folder

Values

Character vector

Default:`' '` (empty character vector)

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';
```

DisplayName property

Class: ModelAdvisor.Task
Package: ModelAdvisor

Name of task

Values

Character vector

Default: `''` (empty character vector)

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';
```

Enable property

Class: ModelAdvisor.Check
Package: ModelAdvisor

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

Enable property

Class: ModelAdvisor.Task
Package: ModelAdvisor

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;
```

Entries property

Class: ModelAdvisor.InputParameter
Package: ModelAdvisor

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'};
```

ID property

Class: ModelAdvisor.Check
Package: ModelAdvisor

Identifier for check

Values

Character vector

Default: `''` (empty character vector)

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`.

ID property

Class: ModelAdvisor.FactoryGroup
Package: ModelAdvisor

Identifier for folder

Values

Character vector

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`.

ID property

Class: ModelAdvisor.Group
Package: ModelAdvisor

Identifier for folder

Values

Character vector

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`.

ID property

Class: ModelAdvisor.Task
Package: ModelAdvisor

Identifier for task

Values

Character vector

Default: `''` (empty character vector)

Description

The `ID` property specifies a permanent, unique identifier for the task.

Note:

- The Model Advisor automatically assigns a unique identifier 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';
```

LicenseName property

Class: ModelAdvisor.Check
Package: ModelAdvisor

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.

LicenseName property

Class: ModelAdvisor.Task
Package: ModelAdvisor

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.

ListViewVisible property

Class: ModelAdvisor.Check
Package: ModelAdvisor

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 **Explore Result** button.
`false`	Hide the **Explore Result** button.

Examples

```
% add 'Explore Result' button
rec.ListViewVisible = true;
```

MAObj property

Class: ModelAdvisor.FactoryGroup
Package: ModelAdvisor

Model Advisor object

Values

Handle to a `Simulink.ModelAdvisor` object

Description

The `MAObj` property specifies a handle to the current Model Advisor object.

MAObj property

Class: ModelAdvisor.Group
Package: ModelAdvisor

Model Advisor object

Values

Handle to `Simulink.ModelAdvisor` object

Description

The `MAObj` property specifies a handle to the current Model Advisor object.

MAObj property

Class: ModelAdvisor.Task
Package: ModelAdvisor

Model Advisor object

Values

Handle to a `Simulink.ModelAdvisor` object

Description

The `MAObj` property specifies the current Model Advisor object.

When adding checks as tasks, the Model Advisor uses the task `MAObj` property instead of the check `MAObj` property.

name property

Class: cv.cvdatagroup
Package: cv

`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';
```

Name property

Class: ModelAdvisor.Action
Package: ModelAdvisor

Action button label

Values

Character vector

Default: `''` (empty character vector)

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';
```

Name property

Class: ModelAdvisor.InputParameter
Package: ModelAdvisor

Input parameter name

Values

Character vector.

Default: `''` (empty character vector)

Description

The `Name` property specifies the name of the input parameter in the custom check.

Examples

```
inputParam2 = ModelAdvisor.InputParameter;
inputParam2.Name = 'Standard font size';
inputParam2.Value='12';
inputParam2.Type='String';
inputParam2.Description='sample tooltip';
```

Name property

Class: ModelAdvisor.ListViewParameter
Package: ModelAdvisor

Drop-down list entry

Values

Character vector

Default: `''` (empty character vector)

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
```

Result property

Class: ModelAdvisor.Check
Package: ModelAdvisor

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.

---

supportExclusion property

Class: ModelAdvisor.Check
Package: ModelAdvisor

Set to support exclusions

Values

Boolean value specifying that the check supports exclusions.
`true` The check supports exclusions.
`false` (default). The check does not support exclusions.

Description

The `supportExclusion` property specifies whether the check supports exclusions.

`'true'`	Check supports exclusions.
`'false'`	Check does not support exclusions.

Examples

```
% specify that a check supports exclusions
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');
rec.supportExclusion = true;
```

SupportLibrary property

Class: ModelAdvisor.Check
Package: ModelAdvisor

Set to support library models

Values

Boolean value specifying that the check supports library models.
`true`. The check supports library models.
`false` (default). The check does not support library models.

Description

The `SupportLibrary` property specifies whether the check supports library models.

`'true'`	Check supports library models.
`'false'`	Check does not support library models.

Examples

```
% specify that a check supports library models
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');
rec.SupportLibrary = true;
```

Title property

Class: ModelAdvisor.Check
Package: ModelAdvisor

Name of check

Values

Character vector

Default: `''` (empty character vector)

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';
```

TitleTips property

Class: ModelAdvisor.Check
Package: ModelAdvisor

Description of check

Values

Character vector

Default: `''` (empty character vector)

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';
```

Type property

Class: ModelAdvisor.InputParameter
Package: ModelAdvisor

Input parameter type

Values

character vector

Default: `''`

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 • Use `Entries` to define the entries in the list. • Use `Value` to indicate a specific entry in the menu or to enter a value not in the list.
`Enum`	Cell array	First entry in the list	A drop-down menu • Use `Entries` to define the entries in the list. • Use `Value` to indicate a specific entry in the list.

Type	Data Type	Default Value	Description
`PushButton`	N/A	N/A	A button When you click the button, the callback function specified by `Entries` is called.
`String`	Character vector	`''`	A text box

Examples

```
% define input parameters
inputParam1 = ModelAdvisor.InputParameter;
inputParam1.Name = 'Skip font checks.';
inputParam1.Type = 'Bool';
inputParam1.Value = false;
```

validate

Class: Advisor.authoring.DataFile
Package: Advisor.authoring

Validate XML data file used for model configuration check

Syntax

```
msg = Advisor.authoring.DataFile.validate(dataFile)
```

Description

`msg = Advisor.authoring.DataFile.validate(dataFile)` validates the syntax of the XML data file used for model configuration checks.

Input Arguments

`dataFile`	XML data file name (character vector)

Examples

```
dataFile = 'myDataFile.xml';
msg = Advisor.authoring.DataFile.validate(dataFile);

if isempty(msg)
   disp('Data file passed the XSD schema validation.');
else
   disp(msg);
end
```

See Also

Advisor.authoring.CustomCheck |
`Advisor.authoring.generateConfigurationParameterDataFile`

How To

- “Create Check for Model Configuration Parameters”

Value property

Class: ModelAdvisor.Check
Package: ModelAdvisor

Status of check

Values

`'true'` (default)
`'false'`

Description

The `Value` property specifies the initial status of the check. When you use the `Value` property to specify the initial status of the check, you enable or disable **Run This Check** in the Model Advisor window.

If you want to specify the initial status of a check in the **By Product** folder, before starting Model Advisor, make sure `ModelAdvisor.Preferences.DeselectByProduct` is `false`.

`'true'`	Check is enabled
`'false'`	Check is disabled

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
```

See Also

ModelAdvisor.Preferences

Value property

Class: ModelAdvisor.InputParameter
Package: ModelAdvisor

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;
```

Value property

Class: ModelAdvisor.Task
Package: ModelAdvisor

Status of task

Values

`'true'` (default) — Initial status of task is enabled
`'false'` — Initial status of task is disabled

Description

The `Value` property indicates the initial status of a task—whether it is enabled or disabled.

When adding checks as tasks, the Model Advisor uses the task `Value` property instead of the check `Value` property.

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');
MAT1.Value ='false';
```

slcovmex

Build coverage-compatible MEX-function from C/C++ code

Syntax

```
slcovmex(sourceFile1,...,sourceFileN)
slcovmex(sourceFile1,...,sourceFileN,-sldv)
slcovmex(sourceFile1,...,sourceFileN,Name,Value)
slcovmex(argumentSet1,...,argumentSetN)
```

Description

`slcovmex(sourceFile1,...,sourceFileN)` compiles level 2 C/C++ MEX S-Function to work with coverage.

`slcovmex(sourceFile1,...,sourceFileN,-sldv)` compiles level 2 C/C++ MEX S-Function to work with coverage, and with support enabled for Simulink Design Verifier.

`slcovmex(sourceFile1,...,sourceFileN,Name,Value)` uses additional options specified by one or more `Name,Value` pair arguments.

`slcovmex(argumentSet1,...,argumentSetN)` combines several `mex` function calls, each with one set of arguments.

Input Arguments

`sourceFile1,...,sourceFileN` — One or more file names

character vectors

Comma-separated source file names with each name specified as a character vector.

If the files are not in the current folder, the file names must include the full path or relative path. Use `pwd` to find the current folder and `cd` to change the current folder.

Example: `'file1.c'`, `'file1.c','file2.c'`

`argumentSet1,...,argumentSetN` — One or more sets of `mex` arguments
Cell arrays of character vectors

Comma-separated `mex` argument sets, with each set specified as a cell array.

If you invoke `mex` multiple times, you can invoke `slcovmex` once and pass the arguments for each `mex` invocation as a cell array of character vectors.

For example, if you use the following sequence of `mex` commands:

```
mex -c file1.c
mex -c file2.c
mex file1.o file2.o -output sfcnOutput
```

You can replace the sequence with one `slcovmex` invocation:

```
slcovmex({'-c','file1.c'},{'-c','file2.c'},{'file1.o','file2.o',
'-output','sfcnOutput'})
```

Example: `{'-c','file1.c'},{'-c','file2.c'},{'file1.o','file2.o','-output','sfcnOutput'}`

`-sldv` — Option to enable support for Simulink Design Verifier
character vector

Option to enable support for your compiled MEX-function in Simulink Design Verifier.

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: You can use all the name-value pair arguments that are allowed for the `mex` function. In addition, you can use the following options that are specific to model coverage.

`'-ifile'` — File ignored for coverage
character vector

File name, specified as a character vector.

Example: `'myFile.c'`

`'-ifcn'` — Function ignored for coverage

character vector

Function name, specified as a character vector.

Example: `'myFunc'`

`'-idir'` — Folder ignored for coverage

character vector

Folder name, specified as a character vector.

All files in the folder are ignored for coverage.

Example: `'C:\Libraries\'`

More About

- "Basic C MEX S-Function"
- "Templates for C S-Functions"
- "Model Coverage for C and C++ S-Functions"
- "View Coverage Results for C/C++ Code in S-Function Blocks"

Introduced in R2015a

view

View Model Advisor run results for checks

Syntax

```
view(CheckResultObj)
```

Description

`view(CheckResultObj)` opens a web browser and displays the results of the check specified by CheckResultObj. CheckResultObj is a `ModelAdvisor.CheckResult` object returned by `ModelAdvisor.run`.

Input Arguments

`CheckResultObj`

`ModelAdvisor.CheckResult` object which is a part of a `ModelAdvisor.SystemResult` object returned by `ModelAdvisor.run`.

Examples

View the Model Advisor run results for the first check in the `slvnvdemo_mdladv_config` configuration file:

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

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

% View the 'Identify unconnected...' check result.
view(SysResultObjArray{1}.CheckResultObjs(1))
```

Alternatives

"View Model Advisor Report"

More About

- "Automate Model Advisor Check Execution"
- "Archive and View Model Advisor Run Results"

See Also

`ModelAdvisor.run` | `ModelAdvisor.summaryReport` | `viewReport`

Introduced in R2010b

viewReport

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`.

Default:

Examples

Open the Model Advisor report for `sldemo_auto_climatecontrol/Heater Control`.

```
% Identify Model Advisor configuration file.
% Create list of models to run.
fileName = 'slvnvdemo_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 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 = 'slvnvdemo_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 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 = 'slvnvdemo_mdladv_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”

More About

- “Automate Model Advisor Check Execution”

- “Archive and View Model Advisor Run Results”

See Also

`ModelAdvisor.run` | `ModelAdvisor.summaryReport` | `view`

Introduced in R2010b

Visible property

Class: ModelAdvisor.Check
Package: ModelAdvisor

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
```

Visible property

Class: ModelAdvisor.Task
Package: ModelAdvisor

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';
```

slmetric.metric.registerMetric

Package: slmetric.metric

Register new metric class

Syntax

```
[MetricID,msg] = slmetric.metric.registerMetric(classname)
```

Description

Register new metric class using `[MetricID,msg] = slmetric.metric.registerMetric(classname)`. The new metric class must be on the MATLAB search path and derived from `slmetric.metric.Metric`.

Examples

Register New Metric Class

This example shows how to register a new metric class `newmetric_class`.

Create a metric class `newmetric_class`.

```
slmetric.metric.createNewMetricClass('newmetric_class')
```

Input Arguments

`classname` — Metric class name

character vector

New metric class name.

Data Types: `char`

Output Arguments

`MetricID` — Metric ID

character vector

Unique metric identifier.

Data Types: `char`

`msg` — Error message

character vector

If you cannot register a new class, the function returns an error message.

Data Types: `char`

See Also

slmetric.metric.Metric | `slmetric.metric.createNewMetricClass` | `slmetric.metric.refresh` | `slmetric.metric.unregisterMetric`

Introduced in R2016a

slmetric.metric.unregisterMetric

Package: slmetric.metric

Unregister the metric class

Syntax

```
slmetric.metric.unregisterMetric(MetricID)
```

Description

Unregister a metric class by using `slmetric.metric.unregisterMetric(MetricID)`.

Input Arguments

`MetricID` — Metric ID

character vector

Unique metric identifier.

Data Types: `char`

See Also

slmetric.metric.Metric | `slmetric.metric.createNewMetricClass` | `slmetric.metric.refresh` | `slmetric.metric.registerMetric`

Introduced in R2016a

slmetric.metric.refresh

Package: slmetric.metric

Update available model metrics

Syntax

```
slmetric.metric.refresh()
```

Description

After manual updates to the metric registration file, update available metrics by using `slmetric.metric.refresh()`.

See Also

slmetric.metric.Metric | `slmetric.metric.createNewMetricClass` | `slmetric.metric.registerMetric` | `slmetric.metric.unregisterMetric`

Introduced in R2016a

slmetric.metric.createNewMetricClass

Package: slmetric.metric

Create metric class

Syntax

```
NewMetricClass = slmetric.metric.createNewMetricClass(classname)
```

Description

Create metric class in the current working folder by using `NewMetricClass = slmetric.metric.createNewMetricClass(classname)`. The new metric class supports the following `Advisor.component.Types`:

- `Model`
- `SubSystem`
- `ModelBlock`
- `Chart`
- `MATLABFunction`

Examples

Create Metric Class

This example shows how to create a metric class `newmetric_class`.

```
slmetric.metric.createNewMetricClass('newmetric_class')
```

The function creates the following `newmetric_class.m` file in the current working folder. The file contains an empty metric algorithm method and a constructor implementation.

```
slmetric.metric.createNewMetricClass('newmetric_class')
```

```
classdef newmetric_class < slmetric.metric.Metric
    % newmetric_class Summary of this metric class goes here
```

```
    %   Detailed explanation goes here
    properties
    end

    methods
        function this = newmetric_class()
            this.ID = 'newmetric_class';
            this.ComponentScope = [Advisor.component.Types.ModelRootLevel, ...
                Advisor.component.Types.SubSystem];
        end

        function res = algorithm(this, component)
            res = slmetric.metric.Result();
            res.ComponentID = component.ID;
            res.MetricID = this.ID;
            res.Value = 0;
        end
    end
end
```

Input Arguments

`classname` — Metric class name

character vector

New metric class name.

Data Types: `char`

Output Arguments

`NewMetricClass` — New metric class

`.m` file

Creates a metric class with a `classname.m` file in the working folder. The `classname.m` file contains an empty metric algorithm method and a constructor implementation.

See Also

Advisor.component.Types | slmetric.metric.Metric | `slmetric.metric.registerMetric` | `slmetric.metric.unregisterMetric`

Introduced in R2016a

exportMetrics

Class: slmetric.Engine
Package: slmetric

Export model metrics

Syntax

```
exportMetrics(slmetric_obj,filename)
exportMetrics(slmetric_obj,filename,filelocation)
```

Description

Export model metric data to an XML file.

`exportMetrics(slmetric_obj,filename)` exports an XML `filename` containing metric data to your working folder.

`exportMetrics(slmetric_obj,filename,filelocation)` exports an XML `filename` containing metric data to `filelocation`.

Input Arguments

`slmetric_obj` — Metric engine object

`slmetric.Engine` object

Constructed `slmetric.Engine` object.

`filename` — XML file name

character vector

Name of XML file.

Example: `'MyMetrics.xml'`

`filelocation` — File path
character vector

Path to XML file

Example: `'C:/mywork'`

Examples

Export Metrics to Working Folder

This example shows how to export metrics for model `vdp` to XML file `MyMetrics.xml`, and then to your working folder.

```
% Create an slmetric.Engine object
slmetric_obj = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(slmetric_obj,'Root','vdp','RootType','Model');

% Generate and collect model metrics
execute(slmetric_obj);
rc = getMetrics(slmetric_obj);

% Export metrics to XML file myMetrics.xml
exportMetrics(slmetric_obj,'MyMetrics.xml');
```

Export Metrics to Specified Location

This example shows how to export metrics for model `vdp` to XML file `MyMetrics.xml` in `C:/work`.

```
% Create an slmetric.Engine object
slmetric_obj = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(slmetric_obj,'Root','vdp','RootType','Model');

% Collect model metrics
execute(slmetric_obj);
rc = getMetrics(slmetric_obj);

% Export metrics to XML file myMetrics.xml
```

```
exportMetrics(slmetric_obj,'MyMetrics.xml','C:/work');
```

See Also

slmetric.metric.ResultCollection | `slmetric.metric.getAvailableMetrics`

More About

- "Model Metrics Results API" on page 4-2
- "Collect Model Metrics Programmatically"
- "Model Metrics"

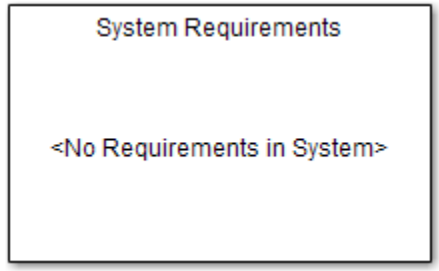
Introduced in R2016a

2

Block Reference

System Requirements

List system requirements in Simulink models



Library

Simulink Verification and Validation

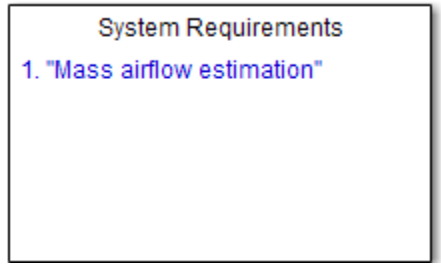
Description

The System Requirements block lists the system-level requirements associated with a model or subsystem. This block is dynamically populated. It displays system requirements associated with the level of hierarchy in which the block appears in the model. It does not list requirements associated with individual blocks in the model. To ensure that all requirement links are listed in the System Requirements block:

1. Right-click the background of your model.
2. Select **Requirements Traceability at This Level**.
3. From the top of the context menu, verify that all the requirements you want to list appear in the System Requirements block.

You can place this block anywhere in your model. It does not connect to other Simulink blocks. You can have only one System Requirements block in a given subsystem.

When you insert this block into your Simulink model, it is populated with the system requirements, as shown in the `Airflow Calculation` subsystem of the `slvnvdemo_fuelsys_officereq` example.



Each of the listed requirements is an active link to the requirements document. When you double-click a requirement label, the associated requirements document opens in its editor window, scrolled to the target location.

Parameters

Block Title

The title of the system requirements list in the model. The default title is `System Requirements`. You can enter a customized title, for example, `Engine Requirements`.

Introduced before R2006a

Model Advisor Checks

Simulink Verification and Validation Checks

In this section...

Simulink Verification and Validation Checks

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, IEC 62304, ISO 26262, and EN 50128 Checks” on page 3-89
- “MathWorks Automotive Advisory Board Checks” on page 3-136

For descriptions of the requirements consistency checks, see “Requirements Consistency Checks” on page 3-226.

See Also

- “Run Model Checks”
- “Simulink Checks”

- “Simulink Coder Checks”

Modeling Standards Checks

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, IEC 62304, ISO 26262, and EN 50128 Checks” on page 3-89
- “MathWorks Automotive Advisory Board Checks” on page 3-136

See Also

- “Run Model Checks”
- “Simulink Checks”
- “Simulink Coder Checks”

Modeling Standards for MAAB

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

- “Run Model Checks”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

Naming Conventions

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

- "Run Model Checks"
- "Simulink Checks"
- "Simulink Coder Checks"
- "MAAB Control Algorithm Modeling" guidelines

Model Architecture

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

- "Run Model Checks"
- "Simulink Checks"
- "Simulink Coder Checks"
- "MAAB Control Algorithm Modeling" guidelines

Model Configuration Options

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

- "Run Model Checks"

- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

Simulink

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

- “Run Model Checks”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

Stateflow

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

- “Run Model Checks”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

MATLAB Functions

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

- “Run Model Checks”
- “Simulink Checks”
- “Simulink Coder Checks”
- “MAAB Control Algorithm Modeling” guidelines

DO-178C/DO-331 Checks

In this section...

DO-178C/DO-331 Checks

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

- “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 model object names

Check ID: `mathworks.do178.hisl_0032`

Check model object names.

Description

This check verifies that the following model object names comply with your own modeling guidelines or the high-integrity modeling guidelines. The check also verifies that the model object does not use a reserved name.

- Blocks
- Signals
- Parameters
- Busses
- Stateflow objects

Reserved names:

- MATLAB keywords
- Reserved keywords for C, C++, and code generation. For complete list, see "Reserved Keywords" in the Simulink Coder™ documentation.
- `int8` , `uint8`
- `int16`, `uint16`
- `int32`, `uint32`
- `inf`, `Inf`
- `NaN`, `nan`
- `eps`
- `intmin`, `intmax`
- `realmin`, `realmax`
- `pi`
- `infinity`
- `Nil`

Note: For some cases, the Model Advisor reports an issue in multiple subchecks of this check.

Available with Simulink Verification and Validation.

Input Parameters

To specify the naming standard and model object names that the check flags, use the Model Advisor Configuration Editor.

1. Open the Model Configuration Editor and navigate to **Check model object names**. In the **Input Parameters** pane, for each of the model objects, select one of the following:
   - `MAAB` to use the MAAB naming standard. When you select `MAAB`, the check uses the regular expression `(^.{32,}$)|([^a-zA-Z_0-9])|(^\d)|(^ )|(__)|(^_)|(_$)` to verify that names:
     - Use these characters: `a-z`, `A-Z`, `0-9`, and the underscore `(_)`.
     - Do not start with a number.
     - Do not use underscores at the beginning or end of a string.
     - Do not use more than one consecutive underscore.
     - Use strings that are less than 32 characters.
   - `Custom` to use your own naming standard. When you select `Custom`, you can enter your own **Regular expression for prohibited *<model object>* names**. For example, if you want to allow more than one consecutive underscore, enter `(^.{32,}$)|([^a-zA-Z_0-9])|(^\d)|(^ )|(^_)|(_$)`
   - `None` if you do not want the check to verify the model object name
2. Click **Apply**.
3. Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

Condition	Recommended Action
The model object names do not comply with the naming standard specified in the input parameters.	Update the model object names to comply with your own guidelines or the high-integrity guidelines.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- "hisl_0032: Model object names"
- MAAB guideline, Version 3.0: jc_0201: Usable characters for Subsystem names
- MAAB guideline, Version 3.0: jc_0211: Usable characters for Inport blocks and Outport blocks
- MAAB guideline, Version 3.0: jc_0221: Usable characters for signal line names
- MAAB guideline, Version 3.0: jc_0231: Usable characters for block names
- MAAB guideline, Version 3.0: na_0030: Usable characters for Simulink Bus names

Check safety-related optimization settings

Check ID: `mathworks.do178.OptionSet`

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 **Block reduction** parameter on the **All Parameters** tab of the Configuration Parameters dialog box or set the parameter `BlockReduction` 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:2012, Rule 10.1.)	Select **Implement logic signals as boolean data (vs. double)** on the **All Parameters** tab in the Configuration Parameters dialog box or set the parameter `BooleanDataType` to `on`.
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	Set **Application lifespan (days)** on the **Optimization** pane in the Configuration Parameters dialog box or set the parameter `LifeSpan` to `inf`.

Condition	Recommended Action
continuously and timers should not assume a limited lifespan. (See DO-331, Section MB.6.3.1.g—Algorithms are accurate and DO-331, Section MB.6.3.2.g—Algorithms are accurate.)	
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.)	If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the **Remove root level I/O zero initialization** check box on the **Optimization** pane in 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.
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.)	If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the **Remove internal data zero initialization** check box on the **Optimization** pane in 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.
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 **Saturate on overflow** 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 and DO-331, Section MB.6.3.2.g—Algorithms are accurate.)	If you have a Simulink Coder license, select **Remove code from floating-point to integer conversions that wraps out-of-range values** on the **Optimization** pane in the Configuration Parameters dialog box or set the parameter `EfficientFloat2IntCast` to `on`.

Condition	Recommended Action
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:2012, Dir 4.1.)	If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the **Remove code that protects against division arithmetic exceptions** check box on the **Optimization** pane in the Configuration Parameters dialog box or set the parameter `NoFixptDivByZeroProtection` to `off`.
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.)	If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the **Optimize using the specified minimum and maximum values** check box on the **Optimization** pane in the Configuration Parameters dialog box.

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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Optimization Pane: General” in the Simulink graphical user interface documentation
- “Optimize Generated Code Using 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
- “hisl_0018: Usage of Logical Operator block”

- "hisl_0045: Configuration Parameters > Optimization > Implement logic signals as Boolean data (vs. double)"
- "hisl_0046: Configuration Parameters > Optimization > Block reduction"
- "hisl_0048: Configuration Parameters > Optimization > Application lifespan (days)"
- "hisl_0052: Configuration Parameters > Optimization > Data initialization"
- "hisl_0053: Configuration Parameters > Optimization > Remove code from floating-point to integer conversions that wraps out-of-range values"
- "hisl_0054: Configuration Parameters > Optimization > Remove code that protects against division arithmetic exceptions"

Check safety-related diagnostic settings for solvers

Check ID: `mathworks.do178.SolverDiagnosticsSet`

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
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.)	Set **Algebraic loop** on the **Diagnostics > Solver** pane in 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.
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.)	Set **Minimize algebraic loop** on the **Diagnostics > Solver** pane in 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.
The diagnostic for detecting potential conflict in block execution order is set to `none` or `warning`. For safety-related applications,	Set **Block priority violation** on the **Diagnostics > Solver** pane in the Configuration Parameters dialog box or set the parameter `BlockPriorityViolationMsg` to `error`.

Condition	Recommended Action
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.)	
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.)	Set **Unspecified inheritability of sample time** on the **All Parameters** pane in the Configuration Parameters dialog box or set the parameter `UnknownTsInhSupMsg` to `error`.
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.)	Set **Automatic solver parameter selection** on the **Diagnostics** > **Solver** pane in the Configuration Parameters dialog box or set the parameter `SolverPrmCheckMsg` to `error`.
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.)	Set **State name clash** on the **Diagnostics** > **Solver** pane in the Configuration Parameters dialog box or set the parameter `StateNameClashWarn` to `warning`.

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to solvers and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- "Model Configuration Parameters: Diagnostics" in the Simulink graphical user interface documentation
- "View Diagnostics" 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
- "hisl_0043: Configuration Parameters > Diagnostics > Solver"

Check safety-related diagnostic settings for sample time

Check ID: `mathworks.do178.SampleTimeDiagnosticsSet`

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
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.)	Set **Source block specifies -1 sample time** on the **Diagnostics** > **Sample Time** pane in the Configuration Parameters dialog box or set the parameter `InheritedTslnSrcMsg` to `error`.
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.)	Set **Multitask rate transition** on the **Diagnostics** > **Sample Time** pane in the Configuration Parameters dialog box or set the parameter `MultiTaskRateTransMsg` to `error`.
The diagnostic for detecting subsystems that can cause data corruption or nondeterministic behavior is set to `none` or `warning`. This diagnostic detects	Set **Multitask conditionally executed subsystem** on the **Diagnostics** > **Sample Time** pane in the Configuration Parameters dialog box or

Condition	Recommended Action
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.)	set the parameter `MultiTaskCondExecSysMsg` to `error`.
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.)	Set **Enforce sample times specified by Signal Specification blocks** on the **Diagnostics > Sample Time** pane in the Configuration Parameters dialog box or set the parameter `SigSpecEnsureSampleTimeMsg` to `error`.

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to sample time and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Model Configuration Parameters: Sample Time Diagnostics” in the Simulink graphical user interface documentation
- “View Diagnostics” 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
- “hisl_0044: Configuration Parameters > Diagnostics > Sample Time”

Check safety-related diagnostic settings for signal data

Check ID: `mathworks.do178.DataValiditySignalsDiagnosticsSet`

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
The diagnostic that specifies how the Simulink software resolves signals associated with `Simulink.Signal` objects is set to `Explicit and implicit` or `Explicit and warn implicit`. 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.)	Set **Signal resolution** on the **Diagnostics > Data Validity** pane in the Configuration Parameters dialog box or set the parameter `SignalResolutionControl` to `Explicit only`. This provides predictable operation by requiring users to define each signal and block setting that must resolve to `Simulink.Signal` objects in the workspace. Alternatively, to disable the use of `Simulink.Signal` objects, set the configuration parameter to `None`.
The Product block diagnostic that detects a singular matrix while inverting one of its inputs in matrix multiplication mode is set to `none` or `warning`. Division by a singular matrix can result in numeric exceptions when executing generated code. 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:2012, Dir 4.1.)	Set **Division by singular matrix** on the **Diagnostics > Data Validity** pane in the Configuration Parameters dialog box or set the parameter `CheckMatrixSingularityMsg` to `error`.

Condition	Recommended Action
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.)	Set **Underspecified data types** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `UnderSpecifiedDataTypeMsg` to `error`.
The diagnostic that detects whether the value of a signal is too large to be represented by the signal 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:2012, Dir 4.1.)	Set **Wrap on overflow** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `IntegerOverflowMsg` to `error`.
The diagnostic that detects whether the value of a signal is too large to be represented by the signal data type, resulting in a saturation, 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:2012, Dir 4.1.)	Set **Saturate on overflow** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `IntegerSaturationMsg` to `error`.
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:2012, Dir 4.1.)	Set **Inf or NaN block output** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `SignalInfNanChecking` to `error`.

Condition	Recommended Action
The diagnostic that detects Simulink object names that begin with `rt` is set to `none` or `warning`. This diagnostic prevents name clashes with generated signal names that have an `rt` 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.)	Set **"rt" prefix for identifiers** on the **Diagnostics > Data Validity** pane in the Configuration Parameters dialog box or set the parameter `RTPrefix` to `error`.
The diagnostic that detects simulation range checking is set to `none` or `warning`. 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:2012, Dir 4.1.)	Set **Simulation range checking** on the **Diagnostics > Data Validity** pane in the Configuration Parameters dialog box or set the parameter `SignalRangeChecking` to `error`.

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to signal data and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Model Configuration Parameters: Data Validity Diagnostics” in the Simulink graphical user interface documentation
- “View Diagnostics” 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
- “hisl_0005: Usage of Product blocks”

Check safety-related diagnostic settings for parameters

Check ID: `mathworks.do178.DataValidityParamDiagnosticsSet`

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
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 and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)	Set **Detect downcast** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `ParameterDowncastMsg` to `error`.
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 and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)	Set **Detect underflow** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `ParameterUnderflowMsg` to `error`.
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	Set **Detect overflow** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `ParameterOverflowMsg` to `error`.

Condition	Recommended Action
accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)	
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 and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)	Set **Detect precision loss** on the **Diagnostics > Data Validity** pane in the Configuration Parameters dialog box or set the parameter `ParameterPrecisionLossMsg` to `error`.
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.)	Set **Detect loss of tunability** on the **Diagnostics > Data Validity** pane in the Configuration Parameters dialog box or set the parameter `ParameterTunabilityLossMsg` to `error`.

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to parameters and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- "Model Configuration Parameters: Data Validity Diagnostics" in the Simulink graphical user interface documentation
- "View Diagnostics" 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

- “hisl_0302: Configuration Parameters > Diagnostics > Data Validity > Parameters”

Check safety-related diagnostic settings for data used for debugging

Check ID: `mathworks.do178.DataValidityDebugDiagnosticsSet`

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.	In the Configuration Parameters dialog box, on the **All Parameters** tab, set **Model Verification block enabling** 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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

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
- “Model Configuration Parameters: Data Validity Diagnostics” 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
- “hisl_0305: Configuration Parameters > Diagnostics > Debugging”

Check safety-related diagnostic settings for data store memory

Check ID: `mathworks.do178.DataStoreMemoryDiagnosticsSet`

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 `Enable all as errors`. Reading data before it is written can result in use of stale data or data that is not initialized.	Set **Detect read before write** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `ReadBeforeWriteMsg` to `Enable all as errors`.
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 `Enable all as errors`. Writing data after it is read can result in use of stale or incorrect data.	Set **Detect write after read** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `WriteAfterReadMsg` to `Enable all as errors`.
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 `Enable all as errors`. Writing data twice in one time step can result in unpredictable data.	Set **Detect write after write** on the **Diagnostics** > **Data Validity** pane in the Configuration Parameters dialog box or set the parameter `WriteAfterWriteMsg` to `Enable all as errors`.
The diagnostic that detects when one task reads data from a Data Store Memory block	Set **Multitask data store** on the **Diagnostics** > **Data Validity** pane in the Configuration

Condition	Recommended Action
to which another task writes data is set to `none` or `warning`. Reading or writing data in different tasks in multitask mode can result in corrupted or unpredictable data.	Parameters dialog box or set the parameter `MultiTaskDSMMsg` to `error`.

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to data store memory and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- "Model Configuration Parameters: Data Validity Diagnostics" 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
- "hisl_0013: Usage of data store blocks"

Check safety-related diagnostic settings for type conversions

Check ID: `mathworks.do178.TypeConversionDiagnosticsSet`

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
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.)	Set **Unnecessary type conversions** on the **Diagnostics > Type Conversion** pane in the Configuration Parameters dialog box or set the parameter `UnnecessaryDatatypeConvMsg` to `warning`.
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 DO-331, Section MB.6.3.2.g – Algorithms are accurate.)	Set **Vector/matrix block input conversion** on the **Diagnostics > Type Conversion** pane in the Configuration Parameters dialog box or set the parameter `VectorMatrixConversionMsg` to `error`.

Condition	Recommended Action
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.)	Set **32-bit integer to single precision float conversion** on the **Diagnostics > Type Conversion** pane in 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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Model Configuration Parameters: Type Conversion Diagnostics” 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
- “hisl_0309: Configuration Parameters > Diagnostics > Type Conversion”

Check safety-related diagnostic settings for signal connectivity

Check ID: `mathworks.do178.ConnectivitySignalsDiagnosticsSet`

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
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.	Set **Signal label mismatch** on the **Diagnostics > Connectivity** pane in the Configuration Parameters dialog box or set the parameter `SignalLabelMismatchMsg` to `error`.
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.	Set **Unconnected block input ports** on the **Diagnostics > Connectivity** pane in the Configuration Parameters dialog box or set the parameter `UnconnectedInputMsg` to `error`.
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 **Unconnected block output ports** on the **Diagnostics > Connectivity** pane in 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 **Unconnected line** on the **Diagnostics > Connectivity** pane in 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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

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
- "Model Configuration Parameters: Connectivity Diagnostics" 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
- "hisl_0306: Configuration Parameters > Diagnostics > Connectivity > Signals"

Check safety-related diagnostic settings for bus connectivity

Check ID: `mathworks.do178.ConnectivityBussesDiagnosticsSet`

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
The diagnostic that detects whether a Model block's root Outport 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.	Set **Unspecified bus object at root Outport block** on the **Diagnostics > Connectivity** pane in the Configuration Parameters dialog box or set the parameter `RootOutportRequireBusObject` to `error`.
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.	Set **Element name mismatch** on the **Diagnostics > Connectivity** pane in the Configuration Parameters dialog box or set the parameter `BusObjectLabelMismatch` to `error`.
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 an unintended operation or unpredictable behavior to occur.	• Set **Mux blocks used to create bus signals** on the **Diagnostics > Connectivity** pane in the Configuration Parameters dialog box to `error`, or set the parameter `StrictBusMsg` to `ErrorOnBusTreatedAsVector`. • Set **Bus signal treated as vector** on the **Diagnostics > Connectivity** pane in the Configuration Parameters dialog box to

Condition	Recommended Action
	`error`, or the parameter `StrictBusMsg` to `ErrorOnBusTreatedAsVector`. You can use the Model Advisor or the `slreplace_mux` utility function to replace all Mux block used as bus creators with a Bus Creator block.

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to bus connectivity and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- "Model Configuration Parameters: Connectivity Diagnostics" 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
- "hisl_0307: Configuration Parameters > Diagnostics > Connectivity > Buses"

Check safety-related diagnostic settings that apply to function-call connectivity

Check ID: `mathworks.do178.FcnCallDiagnosticsSet`

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 **Invalid function-call connection** on the **Diagnostics > Connectivity** pane in the Configuration Parameters dialog box or set the parameter `InvalidFcnCallConMsg` 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 `Use local settings` or `Disable all`. This diagnostic detects unpredictable data coupling between a function-call subsystem and the inputs of the subsystem in the generated code.	Set **Context-dependent inputs** on the **Diagnostics > Connectivity** pane in the Configuration Parameters dialog box or set the parameter `FcnCallInpInsideContextMsg` to `Enable all as errors`.

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to function-call connectivity and that can impact safety.

Capabilities and Limitations

- Does not run on library models.

- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- "Model Configuration Parameters: Connectivity Diagnostics" 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
- "hisl_0308: Configuration Parameters > Diagnostics > Connectivity > Function calls"

Check safety-related diagnostic settings for compatibility

Check ID: `mathworks.do178.CompatibilityDiagnosticsSet`

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
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.	Set **S-function upgrades needed** on the **Diagnostics > Compatibility** pane in the Configuration Parameters dialog box or set the parameter `SFcnCompatibilityMsg` to `error`.

Action Results

Clicking **Modify Settings** configures model diagnostic settings that affect compatibility and that might impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “View Diagnostics” in the Simulink documentation
- “Model Configuration Parameters: Compatibility Diagnostics” 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
- "hisl_0301: Configuration Parameters > Diagnostics > Compatibility"

Check safety-related diagnostic settings for model initialization

Check ID: `mathworks.do178.InitDiagnosticsSet`

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
In the Configuration Parameters dialog box, on the **All Parameters** tab, the "Underspecified initialization detection" diagnostic is set to `Classic`, ensuring compatibility with previous releases of Simulink. The "Check undefined subsystem initial output" 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.	Do one of the following: • In the Configuration Parameters dialog box, on the **All Parameters** tab, set **Underspecified initialization detection** to `Simplified`. • In the Configuration Parameters dialog box, on the **All Parameters** tab, set **Underspecified initialization detection** to `Classic` and select **Check undefined subsystem initial output**. • Set the parameter `CheckSSInitialOutputMsg` to `on`.
In the Configuration Parameters dialog box, on the **All Parameters** tab, the "Underspecified	Do one of the following:

Condition	Recommended Action
initialization detection" diagnostic is set to `Classic`, ensuring compatibility with previous releases of Simulink. 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.	• In the Configuration Parameters dialog box, on the **All Parameters** tab, set **Underspecified initialization detection** to `Simplified`. • In the Configuration Parameters dialog box, on the **All Parameters** tab, set **Underspecified initialization detection** to `Classic`. • Set the parameter `CheckExecutionContextPreStartOutputMsg` to `on`.
In the Configuration Parameters dialog box, on the **All Parameters** tab, the "Underspecified initialization detection" diagnostic is set to `Classic`, ensuring compatibility with previous releases of Simulink. The "Check runtime output of execution context" 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.	Do one of the following: • In the Configuration Parameters dialog box, on the **All Parameters** tab, set **Underspecified initialization detection** to `Simplified`. • In the Configuration Parameters dialog box, on the **All Parameters** tab, set **Underspecified initialization detection** to `Classic` and select **Check runtime output of execution context**. • Set the parameter `CheckExecutionContextRuntimeOutputMsg` to `on`.

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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- MISRA C:2012, Rule 9.1
- “View Diagnostics” in the Simulink documentation
- “Model Configuration Parameters: Data Validity Diagnostics” 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
- “hisl_0304: Configuration Parameters > Diagnostics > Model initialization”

Check safety-related diagnostic settings for model referencing

Check ID: `mathworks.do178.MdlrefDiagnosticsSet`

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
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.)	Set **Model block version mismatch** on the **Diagnostics > Model Referencing** pane in the Configuration Parameters dialog box or set the parameter `ModelReferenceVersionMismatchMessage` to `none`.
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 incorrect simulation results because the parent and referenced models have different	Set **Port and parameter mismatch** on the **Diagnostics > Model Referencing** pane in the Configuration Parameters dialog box or set the parameter `ModelReferenceIOMismatchMessage` to `error`.

Condition	Recommended Action
interfaces. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)	
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.)	Set **Invalid root Inport/Outport block connection** on the **Diagnostics > Model Referencing** pane in the Configuration Parameters dialog box or set the parameter `ModelReferenceIOMessage` to `error`.
The diagnostic that detects whether To Workspace or Scope blocks are logging data in a referenced model is set to `none` or `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.)	Set **Unsupported data logging** on the **Diagnostics > Model Referencing** pane in the Configuration Parameters dialog box or set the parameter `ModelReferenceDataLoggingMessage` to `error`. 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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- "View Diagnostics" in the Simulink documentation

- “Model Configuration Parameters: Model Referencing Diagnostics” 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
- “hisl_0310: Configuration Parameters > Diagnostics > Model Referencing”

Check safety-related model referencing settings

Check ID: `mathworks.do178.MdlrefOptSet`

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
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.)	Set **Rebuild** on the **Model Referencing** pane in the Configuration Parameters dialog box or set the parameter `UpdateModelReferenceTargets` to `Never` or `If any changes detected`.
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 **Rebuild** is set to `Never`. (See DO-331, Section MB.6.3.1.b – High-level requirements are accurate and consistent and DO-331,	Set **Never rebuild diagnostic** on the **Model Referencing** pane in the Configuration Parameters dialog box or set the parameter `CheckModelReferenceTargetMessage` to `error`.

Condition	Recommended Action
Section MB.6.3.2.b – Low-level requirements are accurate and consistent.)	
The ability to pass scalar root input by value is off. 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 Real-Time Workshop** on the **Model Referencing** pane in the Configuration Parameters dialog box or set the parameter `ModelReferencePassRootInputsByReference` to `off`.
The model is configured to minimize algebraic loop occurrences. This configuration is incompatible with the recommended setting of **Single output/update function** for embedded systems code. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)	In the Configuration Parameters dialog box, on the **All Parameters** tab, set **Minimize algebraic loop occurrences** or set the parameter `ModelReferenceMinAlgLoopOccurrences` 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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- "hisl_0037: Configuration Parameters > Model Referencing"
- "Analyze Model Dependencies" in the Simulink documentation
- "Model Configuration Parameters: 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

Check safety-related code generation settings

Check ID: `mathworks.do178.CodeSet`

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 **Include comments** on the **Code Generation** > **Comments** pane in the Configuration Parameters dialog box or set the parameter `GenerateComments` 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 **Simulink block / Stateflow object comments** on the **Code Generation** > **Comments** pane in the Configuration Parameters dialog box or set the parameter `SimulinkBlockComments` 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 **Show eliminated blocks** on the **Code Generation** > **Comments** pane in the Configuration Parameters dialog box or set the parameter `ShowEliminatedStatement` to `on`.
The option to include the names of parameter variables and source blocks as comments in the model parameter structure declaration in *`model`*`_prm.h` is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e	Select **Verbose comments for SimulinkGlobal storage class** on the **Code Generation** > **Comments** pane in the Configuration Parameters dialog box or set the parameter `ForceParamTrailComments` to `on`.

Condition	Recommended Action
– Source code is traceable to low-level requirements.)	
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.)	Select **Requirements in block comments** on the **Code Generation** > **Custom comments** pane in the Configuration Parameters dialog box or set the parameter `ReqsInCode` to `on`.
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.)	Clear **Support: non-finite numbers** on the **Code Generation** > **Interface** pane in the Configuration Parameters dialog box or set the parameter `SupportNonFinite` to `off`.
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.)	Clear **Support: absolute time** on the **Code Generation** > **Interface** pane in the Configuration Parameters dialog box or set the parameter `SupportAbsoluteTime` to `off`.
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.)	Clear **Support: continuous time** on the **Code Generation** > **Interface** pane in the Configuration Parameters dialog box or set the parameter `SupportContinuousTime` to `off`.

Condition	Recommended Action
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.)	Clear **Support: non-inlined S-functions** on the **All Parameters** tab in the Configuration Parameters dialog box or set the parameter `SupportNonInlinedSFcns` to `off`.
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.)	Clear **Classic call interface** on the **Code Generation** > **All Parameters** pane in the Configuration Parameters dialog box or set the parameter `GRTInterface` to `off`.
The option to generate the *`model`*`_update` 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.)	Select **Single output/update function** on the **All Parameters** tab in the Configuration Parameters dialog box or set the parameter `CombineOutputUpdateFcns` to `on`.
The option to generate the *`model`*`_terminate` 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.)	Clear **Terminate function required** on the **All Parameters** tab in the Configuration Parameters dialog box or set the parameter `IncludeMdlTerminateFcn` to `off`.

Condition	Recommended Action
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.)	Select **Remove error status field in real-time model data structure** on the **Code Generation** > **Interface** pane in the Configuration Parameters dialog box or set the parameter `SuppressErrorStatus` to `on`.
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.)	Clear **MAT-file logging** on the **All Parameters** tab in the Configuration Parameters dialog box or set the parameter `MatFileLogging` to `off`.
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:2012, Rule 12.1.)	Set **Parentheses level** on the **Code Generation** > **Code Style** pane in the Configuration Parameters dialog box or set the parameter `ParenthesesLevel` to `Maximum (Specify precedence with parentheses)`.
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.)	Select **Preserve operand order in expression** on the **Code Generation** > **Code Style** pane in the Configuration Parameters dialog box or set the parameter `PreserveExpressionOrder` to `on`.

Condition	Recommended Action
The option that specifies whether to preserve empty primary condition expressions in `if` 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.)	Select **Preserve condition expression in if statement** on the **Code Generation** > **Code Style** pane in the Configuration Parameters dialog box or set the parameter `PreserveIfCondition` to `on`.
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.)	Set **Minimum mangle length** on the **Code Generation** > **Symbols** pane in the Configuration Parameters dialog box or the parameter `MangleLength` to a value of 4 or greater.

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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “hisl_0038: Configuration Parameters > Code Generation > Comments”
- “hisl_0039: Configuration Parameters > Code Generation > Interface”
- “hisl_0047: Configuration Parameters > Code Generation > Code Style”
- “hisl_0049: Configuration Parameters > Code Generation > Symbols”

- “Model Configuration Parameters: Code Generation Comments”“Model Configuration Parameters: Code Generation Comments” in the Simulink Coder reference documentation
- “Model Configuration Parameters: Code Generation Symbols” in the Simulink Coder reference documentation
- “Model Configuration Parameters: Code Generation Interface” in the Simulink Coder reference documentation
- “Model Configuration Parameters: Code Generation 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 ID: `mathworks.do178.SavingDiagnosticsSet`

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 **Block diagram contains disabled library links** on the **All Parameters** tab in the Configuration Parameters dialog box or set the parameter `SaveWithDisabledLinkMsg` 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 **Block diagram contains parameterized library links** on the **All Parameters** tab in the Configuration Parameters dialog box or set the parameter `SaveWithParameterizedLinkMsg` to `error`.

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to saving a model file.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b - Software architecture is consistent

- “hisl_0036: Configuration Parameters > Diagnostics > Saving”
- “Identify disabled library links” in the Simulink documentation
- “Save a Model” in the Simulink documentation
- “Model Parameters” in the Simulink documentation

Check for blocks that do not link to requirements

Check ID: `mathworks.do178.RequirementInfo`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

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 state machine type of Stateflow charts

Check ID: `mathworks.do178.hisf_0001`

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
The input parameter is set to `Common` and charts in the model use either of the following: • Classic state machine types. • Multiple state machine types.	For each chart, in the Chart Properties dialog box, specify **State Machine Type** 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 **State Machine Type** 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 **State Machine Type** to `Moore`.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

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

Check ID: `mathworks.do178.hisf_0002`

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 **User specified state/transition execution order** cleared.	For the specified charts, in the Chart Properties dialog box, select **User specified state/transition execution order**.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

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

Check ID: `mathworks.do178.hisf_0011`

Check the Stateflow debugging settings.

Description

Verify the following debugging settings.

- **Wrap on overflow**
- **Simulation range checking**
- **Detect Cycles**

Available with Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Any of the following: • **Wrap on overflow** is not set to `error`. • **Simulation range checking** is not set to `error`. • **Detect Cycles** is cleared.	In the Configuration Parameters dialog box, set: • **Diagnostics > Data Validity > Wrap on overflow** to `error`. • **Diagnostics > Data Validity > Simulation range checking** to `error`. In the model window, select: • **Simulation > Debug > MATLAB & Stateflow Error Checking Options > Detect Cycles**.

Capabilities and Limitations

- Does not run on library models.
- Does not analyze content of library linked blocks.
- Allows exclusions of blocks and charts.

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 ID: `mathworks.do178.LUTRangeCheckCode`

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. • For the 1-D Lookup Table, 2-D Lookup Table, n-D Lookup Table, and Prelookup blocks, clear the check box for **Remove protection against out-of-range input in generated code**. • For the Interpolation Using Prelookup block, clear the check box for **Remove protection against out-of-range index in generated code**.

Capabilities and Limitations

- Runs on library models.

- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

Action Results

Clicking **Modify** verifies that lookup table blocks are set to generate out-of-range checking code.

See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- "hisl_0033: Usage of Lookup Table blocks"
- 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 ID: `mathworks.do178.himl_0004`

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: • Code lines are not justified with a `%#ok` comment. • Codes lines justified with `%#ok` do not specify a message id.	• Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a `%#ok` comment. • Specify justified code lines with a message id. For example, `%#ok<NOPRT>`.
For MATLAB functions defined in Stateflow charts, either of the following: • Code lines are not justified with a `%#ok` comment. • Codes lines justified with `%#ok` do not specify a message id.	• Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a `%#ok` comment. • Specify justified code lines with a message id. For example, `%#ok<NOPRT>`.

Condition	Recommended Action
For called MATLAB functions: • Code does not have the `%#codegen` directive. • Code lines are not justified with a `%#ok` comment. • Codes lines justified with `%#ok` do not specify a message id.	• Insert `%#codegen` directive in the MATLAB code. • Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a `%#ok` comment. • Specify justified code lines with a message id. For example, `%#ok<NOPRT>`.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

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 ID: `mathworks.do178.himl_0005`

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: • MATLAB code in MATLAB Function blocks • MATLAB functions defined in Stateflow charts • Called MATLAB functions	Replace global variables with signal lines, function arguments, or persistent data.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

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

Check ID: `mathworks.do178.hisl_0021`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

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 interfaces with inherited properties

Check ID: `mathworks.do178.himl_0002`

Identify MATLAB Functions that have inputs, outputs or parameters with inherited complexity or data type properties.

Description

The check identifies MATLAB Functions with inherited complexity or data type properties. A results table provides links to MATLAB Functions 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 Functions have inherited interfaces.	Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Functions identified in the results. If applicable, using the "MATLAB Function Block Editor", make the following modifications in the "Ports and Data Manager": • Change **Complexity** from `Inherited` to `On` or `Off`. • Change **Type** from `Inherit: Same as Simulink` to an explicit type.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

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 metrics

Check ID: `mathworks.do178.himl_0003`

Display complexity and code metrics for MATLAB Functions. Report metric violations.

Description

This check provides complexity and code metrics for MATLAB Functions. The check additionally reports metric violations. A results table provides links to 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 violates the complexity input parameters.	For the MATLAB Function: • If effective lines of code is too high, further divide the MATLAB Function. • If comment density is too low, add comment lines. • If cyclomatic complexity per function is too high, further divide the MATLAB Function.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

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

Check ID: `mathworks.do178.PCGSupport`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “hisl_0020: Blocks not recommended for MISRA C:2012 compliance”
- “Supported Products and Block Usage”

Check for variant blocks with 'Generate preprocessor conditionals' active

Check ID: `mathworks.do178.VariantBlock`

Check variant block parameters for settings that might result in code that does not trace to requirements.

Description

This check verifies that variant block parameters for code generation are set to trace to requirements.

Available with Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
The option to generate preprocessor conditionals is selected in one or more variant blocks in the model.	In order to simplify the tracing of code to requirements, consider clearing the option to generate preprocessor conditionals in variant blocks.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331 Section MB.6.3.4.e — Source code is traceable to low-level requirements
- “hisl_0023: Verification of model and subsystem variants”

Check Stateflow charts for uniquely defined data objects

Check ID: `mathworks.do178.hisl_0061`

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: • Create a unique data object identifier within each of the scopes. • Create a unique data object identifier within the chart, at the parent level.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “hisl_0061: Unique identifiers for clarity”

Check usage of Math Operations blocks

Check ID: `mathworks.do178.MathOperationsBlocksUsage`

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
The model or subsystem contains an Absolute Value block that is operating on one of the following: • A boolean or an unsigned input data type. This condition results in unreachable simulation pathways through the model and might result in unreachable code • A signed integer value with the **Saturate on integer overflow** check box not selected. For signed data types, the absolute value of the most negative value is problematic because it is not	If the identified Absolute Value block is operating on a boolean or unsigned data type, do one of the following: • Change the input of the Absolute Value block to a signed input type. • Remove the Absolute Value block from the model. If the identified Absolute Value block is operating on a signed data type, in the **Block Parameters > Signal Attributes** dialog box, select **Saturate on integer overflow**.

Condition	Recommended Action
representable by the data type. This condition results in an overflow in the generated code.	
The model or subsystem contains Gain blocks with a of value 1 or an identity matrix.	If you are using Gain blocks as buffers, consider replacing them with Signal Conversion blocks.
The model or subsystem contains Math Function - Natural logarithm (`log`) 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 `log` function, protect the input to the block from being less than or equal to zero. Otherwise, the output can produce a `NaN` or `-Inf` and result in a run-time error in the generated code.
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.	When using the Math Function block with a `log10` function, protect the input to the block from being less than or equal to zero. Otherwise, the output can produce a `NaN` or `-Inf` and result in a run-time error in the generated code.
The model or subsystem contains Math Function - Remainder after division(`rem`) 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 `rem` function, protect the second 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 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.

Condition	Recommended Action
The model or subsystem might contain Assignment blocks with incomplete array initialization that do not have block parameter **Action if any output element is not assigned** set to `Error` or `Warning`.	Set block parameter **Action if any output element is not assigned** to one of the recommended values: • `Error`, if Assignment block is not in an Iterator subsystem. • `Warning`, if Assignment block is in an Iterator subsystem.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

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:2012, Dir 4.1
- MISRA C:2012, Rule 9.1
- “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

Check ID: `mathworks.do178.SignalRoutingBlockUsage`

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 (~=) in expressions that contain a floating-point variable or constant.

Available with Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
The model or subsystem contains a Switch block that might generate code with inequality operations (~=) 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.	For the identified block, do one of the following: • For the control input block, change the **Data type** parameter setting. • Change the Switch block **Criteria for passing first input** parameter setting. This might change the algorithm.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- MISRA C:2012, Dir 1.1
- “hisl_0034: Usage of Signal Routing blocks”

Check usage of Logic and Bit Operations blocks

Check ID: `mathworks.do178.LogicBlockUsage`

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.	For the identified blocks, use common data types as inputs. You can use Data Type Conversion blocks to change input data types.
The model or subsystem contains a block computing a relational operator that does not have Boolean output. The condition can lead to unpredictable results in the generated code.	For the specified blocks, on the Block Parameters > Signal Attributes pane, set the **Output data type** to `boolean`.
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: • Change the signal data type. • Rework the model to eliminate using == or ~= operators on floating-point signals.

Condition	Recommended Action
The model or subsystem contains a Logical Operator block that has inputs or outputs that are not Boolean inputs or outputs. The block might result in floating-point equality or inequality comparisons in the generated code.	• Modify the Logical Operator block so that all inputs and outputs are Boolean. On the Block Parameters > Signal Attributes pane, consider selecting **Require all inputs to have the same data type** and setting **Output data type** to `boolean`. • In the Configuration Parameters dialog box, on the **All Parameters** tab, consider selecting the **Implement logic signals as boolean data (vs. double)**.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- MISRA C:2012, Dir 1.1
- MISRA C:2012, Rule 10.1
- “hisl_0016: Usage of blocks that compute relational operators”
- “hisl_0017: Usage of blocks that compute relational operators (2)”
- “hisl_0018: Usage of Logical Operator block”

Check usage of Ports and Subsystems blocks

Check ID: `mathworks.do178.PortsSubsystemsUsage`

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
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.	For the identified For Iterator blocks, do one of the following: • Set the **Iteration limit source** parameter to `internal`. • If the **Iteration limit source** parameter must be `external`, use a Constant, Probe, or Width block as the source. • Clear the Set next **i (iteration variable) externally** check box. • Consider selecting the **Show iteration variable** check box and observe the iteration value during simulation.
The model or subsystem contains a While Iterator block that has unlimited iterations. This condition can lead to infinite loops in the generated code.	For the identified While Iterator blocks: • Set the **Maximum number of iterations (-1 for unlimited)** parameter to a positive integer value.

Condition	Recommended Action
	• Consider selecting the **Show iteration number port** check box and observe the iteration value during simulation.
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 Block Parameters dialog box, select **Show else condition**. 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 Block Parameters dialog box, select **Show default case**. 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.

Condition	Recommended Action
The model or subsystem contains one of the following time-dependent blocks in a For Iterator or While Iterator subsystem: • Discrete Filter • Discrete FIR Filter • Discrete State-Space • Discrete Transfer Fcn • Discrete Zero-Pole • Transfer Fcn First Order • Transfer Fcn Lead or Lag • Transfer Fnc Real Zero • Discrete Derivative • Discrete Transfer Fcn (with initial outputs) • Discrete Transfer Fcn (with initial states) • Discrete Zero-Pole (with initial outputs) • Discrete Zero-Pole (with initial states)	In the model or subsystem, consider removing the time-dependent blocks.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

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

- DO-331, Section MB.6.3.1.b - High-level requirements are accurate and consistent
- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- MISRA C:2012, Rule 14.2
- MISRA C:2012, Rule 16.4
- MISRA C:2012, Dir 4.1
- “hisl_0006: Usage of While Iterator blocks”
- “hisl_0007: Usage of While Iterator subsystems”
- “hisl_0008: Usage of For Iterator Blocks”
- “hisl_0009: Usage of For Iterator Subsystem blocks”

Display model version information

Check ID: `mathworks.do178.MdlChecksum`

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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

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, IEC 62304, ISO 26262, and EN 50128 Checks

In this section...

IEC 61508, IEC 62304, ISO 26262, and EN 50128 Checks

IEC 61508, IEC 62304, 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, IEC 62304, 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, IEC 62304, ISO 26262, or EN 50128 checks.

Tips

If your model uses model referencing, run the IEC 61508, IEC 62304, 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
- IEC 62304 Medical device software - Software life cycle processes
- 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”
  - “IEC 62304 Standard”
  - “ISO 26262 Standard”
  - “EN 50128 Standard”

Check model object names

Check ID: `mathworks.iec61508.hisl_0032`

Check model object names.

Description

This check verifies that the following model object names comply with your own modeling guidelines or the high-integrity modeling guidelines. The check also verifies that the model object does not use a reserved name.

- Blocks
- Signals
- Parameters
- Busses
- Stateflow objects

Reserved names:

- MATLAB keywords
- Reserved keywords for C, C++, and code generation. For complete list, see "Reserved Keywords" in the Simulink Coder documentation.
- `int8` , `uint8`
- `int16`, `uint16`
- `int32`, `uint32`
- `inf`, `Inf`
- `NaN`, `nan`
- `eps`
- `intmin`, `intmax`
- `realmin`, `realmax`
- `pi`
- `infinity`
- `Nil`

Note: For some cases, the Model Advisor reports an issue in multiple subchecks of this check.

Available with Simulink Verification and Validation.

Input Parameters

To specify the naming standard and model object names that the check flags, use the Model Advisor Configuration Editor.

1. Open the Model Configuration Editor and navigate to **Check model object names**. In the **Input Parameters** pane, for each of the model objects, select one of the following:
   - `MAAB` to use the MAAB naming standard. When you select `MAAB`, the check uses the regular expression `(^.{32,}$)|([^a-zA-Z_0-9])|(^\d)|(^ )|(__)|(^_)|(_$)` to verify that names:
     - Use these characters: `a-z`, `A-Z`, `0-9`, and the underscore `(_)`.
     - Do not start with a number.
     - Do not use underscores at the beginning or end of a string.
     - Do not use more than one consecutive underscore.
     - Use strings that are less than 32 characters.
   - `Custom` to use your own naming standard. When you select `Custom`, you can enter your own **Regular expression for prohibited *<model object>* names**. For example, if you want to allow more than one consecutive underscore, enter `(^.{32,}$)|([^a-zA-Z_0-9])|(^\d)|(^ )|(^_)|(_$)`
   - `None` if you do not want the check to verify the model object name
2. Click **Apply**.
3. Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

Condition	Recommended Action
The model object names do not comply with the naming standard specified in the input parameters.	Update the model object names to comply with your own or the high-integrity guidelines.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- “hisl_0032: Model object names”
- MAAB guideline, Version 3.0: jc_0201: Usable characters for Subsystem names
- MAAB guideline, Version 3.0: jc_0211: Usable characters for Inport blocks and Outport blocks
- MAAB guideline, Version 3.0: jc_0221: Usable characters for signal line names
- MAAB guideline, Version 3.0: jc_0231: Usable characters for block names
- MAAB guideline, Version 3.0: na_0030: Usable characters for Simulink Bus names

Display model metrics and complexity report

Check ID: `mathworks.iec61508.MdlMetricsInfo`

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, including library linked blocks.
- 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).
- The maximum subsystem depth of the given model.

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

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- IEC 61508-3, Table B.9 (1) - Software module size limit, Table B.9 (2) - Software complexity control

- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1a) - Enforcement of low complexity, Table 3 (a) - Hierarchical structure of software components, Table 3 (b) - Restricted size of software components, and Table 3 (c) - 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 for Stateflow Charts" in the Simulink Verification and Validation documentation

Check for unconnected objects

Check ID: `mathworks.iec61508.UnconnectedObjects`

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.	• Double-click an element in the list of unconnected items to locate the item in the model diagram. • Connect the objects identified in the results.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- 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

Check ID: `mathworks.iec61508.RootLevelInports`

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. You can specify Inport block properties with block parameters or Simulink signal objects that explicitly resolve to the connected signal lines. When you run the check, a results table provides links to Inport blocks and signal objects that do not pass, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Missing port dimension — Model contains Inport blocks with inherited port dimensions.	For the listed Inport blocks and Simulink signal objects, specify port dimensions.
Missing signal data type — Model contains Inport blocks with inherited data types.	For the listed Inport blocks and Simulink signal objects, specify data types.
Missing port sample time — Model contains Inport blocks with inherited sample times.	For the listed Inport blocks and Simulink signal objects, 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.
Implicit resolution to a Simulink signal object — Model contains Inport block signal names that implicitly resolve to a Simulink signal object in the base workspace, model workspace, or Simulink data dictionary.	For the listed Simulink signal objects, in the property dialog, select signal property **Signal name must resolve to Simulink signal object**.

Capabilities and Limitations

- Does not run on library models.
- Allows exclusions of blocks and charts.

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 (6) - Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-4, Table 2 (2) - Precisely defined interfaces
- EN 50128, Table A.3 (19) - Fully Defined Interface
- “About Data Types in Simulink” in the Simulink documentation
- “Determine Output Signal Dimensions” in the Simulink documentation
- “Specify Sample Time” in the Simulink documentation
- “hisl_0024: Inport interface definition”

Check for MATLAB Function interfaces with inherited properties

Check ID: `mathworks.iec61508.himl_0002`

Identify MATLAB Functions that have inputs, outputs or parameters with inherited complexity or data type properties.

Description

The check identifies MATLAB Functions with inherited complexity or data type properties. A results table provides links to MATLAB Functions 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 Functions have inherited interfaces.	Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Functions identified in the results. If applicable, using the "MATLAB Function Block Editor", make the following modifications in the "Ports and Data Manager": • Change **Complexity** from `Inherited` to `On` or `Off`. • Change **Type** from `Inherit: Same as Simulink` to an explicit type.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table B.9 (6) - Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- 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 metrics

Check ID: `mathworks.iec61508.himl_0003`

Display complexity and code metrics for 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 Functions. The check additionally reports metric violations.

A results table provides links to 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 violates the complexity input parameters.	For the MATLAB Function: • If effective lines of code is too high, further divide the MATLAB Function. • If comment density is too low, add comment lines.

Condition	Recommended Action
	• If cyclomatic complexity per function is too high, further divide the MATLAB Function.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table B.9 (6) - Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- 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

Check ID: `mathworks.iec61508.InportRange`

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. You can specify Inport block minimum and maximum values with block parameters or Simulink signal objects that explicitly resolve to the connected signal lines. A results table provides links to Inport blocks and signal objects 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
Missing range — Model contains Inport blocks with numeric data types that have missing range parameters (minimum and/or maximum).	For the listed Inport blocks and Simulink signal objects, specify scalar minimum and maximum parameters.
Missing range(s) for bus object — Bus objects defining the Inport blocks have leaf elements with missing ranges.	For the listed leaf elements, to specify the model interface range, provide scalar minimum and maximum parameters .
Range specified will be ignored — Minimum or maximum values at Inports or Simulink signal objects 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. To enable the use of minimum and maximum values with bus objects, set configuration parameter **Diagnostics > Connectivity > Buses > Mux blocks used to create bus signals** to `error`.
No data type specified — Model contains Inport blocks or Simulink signal objects with inherited data types.	Specify one of the supported data types: • `Enum`

Condition	Recommended Action
	• `Simulink.AliasType` • `Simulink.Bus` • `Simulink.NumericType` • build-in
Implicit resolution to a Simulink signal object — Model contains Inport block signal names that implicitly resolve to a Simulink signal object in the base workspace, model workspace, or Simulink data dictionary.	For the listed Simulink signal objects, in the property dialog, select signal property **Signal name must resolve to Simulink signal object**.

Capabilities and Limitations

- Does not run on library models.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table B.9 (6) – Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- 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

Check ID: `mathworks.iec61508.OutportRange`

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. You can specify Outport block minimum and maximum values with block parameters or Simulink signal objects that explicitly resolve to the connected signal lines. 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
Missing range — Model contains Outport blocks with numeric data types that have missing range parameters (minimum and/or maximum).	For the listed Outport blocks and Simulink signal objects, specify scalar minimum and maximum parameters.
Missing range(s) for bus object — Bus objects defining the Outport blocks have leaf elements with missing ranges.	For the listed leaf elements, to specify the model interface range, provide scalar minimum and maximum parameters.
Range specified at Outport will be ignored — Minimum or maximum values at Outports or Simulink signal objects 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. To enable the use of minimum and maximum values with bus objects, set configuration parameter **Diagnostics > Connectivity > Buses > Mux blocks used to create bus signals** to `error`.
No bus data type specified — Model contains Outport block or Simulink signal objects with inherited bus data types.	For the Outport blocks and Simulink signal objects, specify one of the supported data types:

Condition	Recommended Action
	• `Enum` • `Simulink.AliasType` • `Simulink.Bus` • `Simulink.NumericType` • build-in
Implicit resolution to a Simulink signal object — Model contains Outport block signal names that implicitly resolve to a Simulink signal object in the base workspace, model workspace, or Simulink data dictionary.	For the listed Simulink signal objects, in the property dialog, select signal property **Signal name must resolve to Simulink signal object**.

Capabilities and Limitations

- Does not run on library models.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table B.9 (6) – Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- 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

Check ID: `mathworks.iec61508.PCGSupport`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- 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

Check ID: `mathworks.iec61508.StateflowProperUsage`

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
A Stateflow chart is not configured for strong data typing on boundaries between a Simulink model and the Stateflow chart. See: • "hisf_0009: Strong data typing (Simulink and Stateflow boundary)" • IEC 61508-3, Table A.3 (2) - Strongly typed programming language • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1c) - Enforcement of strong typing • EN 50128, Table A.4 (8) - Strongly Typed Programming Language	In the Chart properties dialog box, select **Use Strong Data Typing with Simulink I/O** 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.

Condition	Recommended Action
Signals have names that differ from those of their corresponding Stateflow ports. See: • IEC 61508-3, Table A.3 (3) - Language subset • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets • EN 50128, Table A.4 (11) - Language Subset	• Check whether the ports are connected and, if not, fix the connections. • Change the names of the signals or the Stateflow ports so that the names match.
Local data is not defined in the Stateflow hierarchy at the chart level or below. See: • IEC 61508-3, Table A.3 (3) - Language subset • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets • EN 50128, Table A.4 (11) - Language Subset	Define local data at the chart level or below.

Condition	Recommended Action
A new line is missing from a state action after: • An `entry` (`en`), `during` (`du`), or `exit` (`ex`) statement • The semicolon (;) at the end of an assignment statement See: • IEC 61508-3, Table A.3 (3) - Language subset • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets • EN 50128, Table A.4 (11) - Language Subset	Add missing new lines.
Stateflow charts have **User specified state/transition execution order** cleared. See: • "hisf_0002: User-specified state/transition execution order" • IEC 61508-3, Table A.3 (3) - Language subset • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1f) - Use of unambiguous graphical representation • EN 50128, Table A.4 (11) - Language Subset	For the specified charts, in the Chart Properties dialog box, select **User specified state/transition execution order**.

Condition	Recommended Action
Any of the following: • **Wrap on overflow** is not set to `error`. • **Simulation range checking** is not set to `error`. • **Detect Cycles** is cleared. See: • "hisf_0011: Stateflow debugging settings" • IEC 61508-3, Table A.3 (3) - Language subset • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1d) - Use of defensive implementation techniques • EN 50128, Table A.3 (1) - Defensive Programming • EN 50128, Table A.4 (11) - Language Subset	In the Configuration Parameters dialog box, set: • **Diagnostics > Data Validity > Wrap on overflow** to `error`. • **Diagnostics > Data Validity > Simulation range checking** to `error`. In the model window, select: • **Simulation > Debug > MATLAB & Stateflow Error Checking Options > Detect Cycles**.

Condition	Recommended Action
The Stateflow chart contains a data object identifier defined in two or more scopes. See: • "hisl_0061: Unique identifiers for clarity" • IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (5) - Design and coding standards • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1e) - Use of established design principles, Table 1 (1f) - Use of unambiguous graphical representation, Table 1 (1g) - Use of style guides, Table 1 (1h) - Use of naming conventions • EN 50128, Table A.4 (11) - Language Subset, Table A.12 (1) - Coding Standard, Table A.12 (2) - Coding Style Guide	For the identified chart, do one of the following: • Create a unique data object identifier within each of the scopes. • Create a unique data object identifier within the chart, at the parent level.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts. Exclusions will not work for library linked charts.

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 Stateflow Data”
- “Label States”
- “Chart Properties”
- “Chart Architecture”

Check state machine type of Stateflow charts

Check ID: `mathworks.iec61508.hisf_0001`

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: • Classic state machine types. • Multiple state machine types.	For each chart, in the Chart Properties dialog box, specify **State Machine Type** 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 **State Machine Type** 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 **State Machine Type** to `Moore`.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.4 (11) - Language Subset
- “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 ID: `mathworks.iec61508.RequirementInfo`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Tip

Run this check from the top model or subsystem that you want to check.

See Also

- IEC 61508-3, Table A.2 (12) - Computer-aided specification and design tools, Table A.2 (9) - Forward traceability between the software safety requirements specification and software architecture, Table A.2 (10) - Backward traceability between the software safety requirements specification and software architecture, Table A.4 (8) - Forward traceability between the software safety requirements specification and software design, Table A.8 (1) - Impact analysis
- IEC 62304, 5.2 - Software requirements analysis, 7.4.2 - Analyze impact of software changes on existing risk control measures

- ISO 26262-6, Table 8 (1a) - Documentation of the software unit design in natural language, ISO 26262-6: 7.4.2.a - The verifiability of the software architectural design, ISO 26262-8: 8.4.3 Change request analysis
- EN 50128, Table A.3 (23) - Modeling supported by computer aided design and specification tools, Table D.58 - Traceability, Table A.10 (1) - Impact Analysis
- “Requirements Traceability”

Check for inconsistent vector indexing methods

Check ID: `mathworks.iec61508.hisl_0021`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508–3, Table A.3 (3) - Language subset, Table A.4 (5) - Design and coding standards
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1e) - Use of established design principles, Table 1 (1f) - Use of unambiguous graphical representation, Table 1 (1g) - Use of style guides, Table 1 (1h) - Use of naming conventions
- 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 ID: `mathworks.iec61508.himl_0004`

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: • Code lines are not justified with a `%#ok` comment. • Codes lines justified with `%#ok` do not specify a message id.	• Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a `%#ok` comment. • Specify justified code lines with a message id. For example, `%#ok<NOPRT>`.
For MATLAB functions defined in Stateflow charts, either of the following: • Code lines are not justified with a `%#ok` comment. • Codes lines justified with `%#ok` do not specify a message id.	• Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a `%#ok` comment. • Specify justified code lines with a message id. For example, `%#ok<NOPRT>`.

Condition	Recommended Action
For called MATLAB functions: • Code does not have the `%#codegen` directive. • Code lines are not justified with a `%#ok` comment. • Codes lines justified with `%#ok` do not specify a message id.	• Insert `%#codegen` directive in the MATLAB code. • Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a `%#ok` comment. • Specify justified code lines with a message id. For example, `%#ok<NOPRT>`.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (3) - Defensive programming, Table A.4 (5) - Design and coding standards
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques, Table 1 (1e) - Use of established design principles, Table 1 (1f) - Use of unambiguous graphical representation, Table 1 (1g) - Use of style guides, Table 1 (1h) - Use of naming conventions
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming, Table A.12 (1) - Coding Standard, Table A.12 (2) - Coding Style Guide
- “Check Code for Errors and Warnings”
- “himl_0004: MATLAB Code Analyzer recommendations for code generation”

Check MATLAB code for global variables

Check ID: `mathworks.iec61508.himl_0005`

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: • MATLAB code in MATLAB Function blocks • MATLAB functions defined in Stateflow charts • Called MATLAB functions	Replace global variables with signal lines, function arguments, or persistent data.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- IEC 61508-3, Table A.3 (3) – Language subset
- IEC 62304, 5.5.3 - Software Unit acceptance criteria

- 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

Check ID: `mathworks.iec61508.MathOperationsBlocksUsage`

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
The model or subsystem contains an Absolute Value block that is operating on one of the following: • A boolean or an unsigned input data type. This condition results in unreachable simulation pathways through the model and might result in unreachable code • A signed integer value with the **Saturate on integer overflow** 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. This condition results in an overflow in the generated code.	If the identified Absolute Value block is operating on a boolean or unsigned data type, do one of the following: • Change the input of the Absolute Value block to a signed input type. • Remove the Absolute Value block from the model. If the identified Absolute Value block is operating on a signed data type, in the **Block Parameters > Signal Attributes** dialog box, select **Saturate on integer overflow**.
The model or subsystem contains Gain blocks with a of value 1 or an identity matrix.	If you are using Gain blocks as buffers, consider replacing them with Signal Conversion blocks.

Condition	Recommended Action
The model or subsystem might contain Assignment blocks with incomplete array initialization that do not have block parameter **Action if any output element is not assigned** set to `Error` or `Warning`.	Set block parameter **Action if any output element is not assigned** to one of the recommended values: • `Error`, if Assignment block is not in an Iterator subsystem. • `Warning`, if Assignment block is in an Iterator subsystem.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (3) - Defensive programming, Table A.3 (2) - Strongly typed programming language, Table B.8 (3) - Control Flow Analysis
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques, Table 9 (1f) - Control flow analysis
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming, EN 50128, Table A.4 (8) - Strongly Typed Programming Language, Table A.19 (3) - Control Flow Analysis
- MISRA C:2012, Dir 4.1
- MISRA C:2012, Rule 9.1
- “hisl_0001: Usage of Abs block”
- “hisl_0029: Usage of Assignment blocks”

Check usage of Signal Routing blocks

Check ID: `mathworks.iec61508.SignalRoutingBlockUsage`

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 (~=) in expressions that contain a floating-point variable or constant.

Available with Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
The model or subsystem contains a Switch block that might generate code with inequality operations (~=) 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.	For the identified block, do one of the following: • For the control input block, change the **Data type** parameter setting. • Change the Switch block **Criteria for passing first input** parameter setting. This might change the algorithm.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) – Language subset, Table A.4 (3) – Defensive programming
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- 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:2012, Dir 1.1

Check usage of Logic and Bit Operations blocks

Check ID: `mathworks.iec61508.LogicBlockUsage`

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 Block Parameters > Signal Attributes pane, set the **Output data type** 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: • Change the signal data type. • Rework the model to eliminate using == or ~= operators on floating-point signals.
The model or subsystem contains a Logical Operator block that has inputs or outputs that are not Boolean inputs or outputs. The block might result in floating-point equality or inequality comparisons in the generated code.	• Modify the Logical Operator block so that the inputs and outputs are Boolean. On the Block Parameters > Signal Attributes pane, consider selecting **Require all inputs to have the same data type** and setting **Output data type** to `boolean`.

Condition	Recommended Action
	• In the Configuration Parameters dialog box, on the **All Parameters** pane, consider selecting the **Implement logic signals as boolean data (vs. double)**.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

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
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- 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:2012, Dir 1.1
- MISRA C:2012, Rule 10.1
- “hisl_0016: Usage of blocks that compute relational operators”
- “hisl_0017: Usage of blocks that compute relational operators (2)”
- “hisl_0018: Usage of Logical Operator block”

Check usage of Ports and Subsystems blocks

Check ID: `mathworks.iec61508.PortsSubsystemsUsage`

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
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.	For the identified For Iterator blocks, do one of the following: • Set the **Iteration limit source** parameter to `internal`. • If the **Iteration limit source** parameter must be `external`, use a Constant, Probe, or Width block as the source. • Clear the Set next **i (iteration variable) externally** check box. • Consider selecting the **Show iteration variable** check box and observe the iteration value during simulation.
The model or subsystem contains a While Iterator block that has unlimited iterations. This condition can lead to infinite loops in the generated code.	For the identified While Iterator blocks: • Set the **Maximum number of iterations (-1 for unlimited)** parameter to a positive integer value.

Condition	Recommended Action
	• Consider selecting the **Show iteration number port** check box and observe the iteration value during simulation.
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 Block Parameters dialog box, select **Show else condition**. 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 Block Parameters dialog box, select **Show default case**. 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.

Condition	Recommended Action
The model or subsystem contains one of the following time-dependent blocks in a For Iterator or While Iterator subsystem: • Discrete Filter • Discrete FIR Filter • Discrete State-Space • Discrete Transfer Fcn • Discrete Zero-Pole • Transfer Fcn First Order • Transfer Fcn Lead or Lag • Transfer Fnc Real Zero • Discrete Derivative • Discrete Transfer Fcn (with initial outputs) • Discrete Transfer Fcn (with initial states) • Discrete Zero-Pole (with initial outputs) • Discrete Zero-Pole (with initial states)	In the model or subsystem, consider removing the time-dependent blocks.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (3) - Defensive programming
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- 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:2012, Rule 14.2
- MISRA C:2012, Rule 16.4
- MISRA C:2012, Dir 4.1
- “hisl_0006: Usage of While Iterator blocks”
- “hisl_0007: Usage of While Iterator subsystems”
- “hisl_0008: Usage of For Iterator Blocks”
- “hisl_0009: Usage of For Iterator Subsystem blocks”

Display configuration management data

Check ID: `mathworks.iec61508.MdlVersionInfo`

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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- IEC 61508-3, Table A.8 (5) – Software configuration management
- IEC 62304-8 – Software configuration management process
- ISO 26262-8, Clause 7 – Configuration management
- 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...

In this section...

In this section...
“Check scope of From and Goto blocks” on page 3-216

MathWorks Automotive Advisory Board Checks

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

- “Run Model Checks” 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 website, which lists downloads for the latest version of *Control Algorithm Modeling Guidelines Using MATLAB, Simulink, and Stateflow*

Check font formatting

Check ID: `mathworks.maab.db_0043`

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 **Modify all Fonts**, or manually change the fonts and font sizes of text elements in the model so they are consistent and portable.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

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, Version 3.0: db_0043: Simulink font and font size in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0043: Simulink font and font size.

Check transition orientations in flow charts

Check ID: `mathworks.maab.db_0132`

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.

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

- MAAB guideline, Version 3.0 limitation: Although db_0132: Transitions in flow charts has an exception for loop constructs, the check does flag flow charts containing loop constructs if the transition violates the orientation rule.
- JMAAB guideline, Version 4.0 limitation: The check only flags flow charts containing loop constructs if the transition violates the orientation rule.
- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0132: Transitions in flow charts in the Simulink documentation.

- JMAAB guideline, Version 4.0: db_0132: Transitions in Flow Charts.

Check for nondefault block attributes

Check ID: `mathworks.maab.db_0140`

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 **Block Annotation** tab to add block parameter annotations.

Capabilities and Limitations

- JMAAB guideline, Version 4.0 limitation: The check flags masked blocks that display parameter information but do not use block annotations. JMAAB 4.0 guidelines allow masked blocks to display parameter information.
- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

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, Version 3.0: db_0140: Display of basic block parameters in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0140: Display of 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 ID: `mathworks.maab.na_0008`

Check the labeling on signal lines.

Description

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

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: na_0008: Display of labels on signals in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0008: Display of labels on signals.
- “Signal Names and Labels” in the Simulink documentation.

Check for propagated signal labels

Check ID: `mathworks.maab.na_0009`

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

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: na_0009: Entry versus propagation of signal labels in the Simulink documentation.

- JMAAB guideline, Version 4.0: na_0009: Entry versus propagation of signal labels.
- “Signal Names and Labels” in the Simulink documentation.

Check default transition placement in Stateflow charts

Check ID: `mathworks.maab.jc_0531`

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 default transition is lower than other states in the same hierarchy.	Adjust the position of the default transition destination state so that the state is above other states in the same hierarchy.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0531: Placement of the default transition in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0531: Placement of the default transition.
- “Syntax for States and Transitions”

Check return value assignments of graphical functions in Stateflow charts

Check ID: `mathworks.maab.jc_0511`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0511: Setting the return value from a graphical function in the Simulink documentation.
- JMAAB guideline, Version 4.0: 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

Check ID: `mathworks.maab.jc_0501`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: jc_0501: Format of entries in a State block in the Simulink documentation.

Check usage of return values from a graphical function in Stateflow charts

Check ID: `mathworks.maab.jc_0521`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0521: Use of the return value from graphical functions in the Simulink documentation.
- JMAAB guideline, Version 4.0: 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

Check ID: `mathworks.maab.jm_0011`

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

- Applies only to Stateflow charts that use C as the action language.
- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jm_0011: Pointers in Stateflow in the Simulink documentation.
- JMAAB guideline, Version 4.0: jm_0011: Pointers in Stateflow.

Check for event broadcasts in Stateflow charts

Check ID: `mathworks.maab.jm_0012`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jm_0012: Event broadcasts in the Simulink documentation.
- JMAAB guideline, Version 4.0: jm_0012: Event broadcasts.
- “Broadcast Events to Synchronize States” in the Stateflow documentation.

Check transition actions in Stateflow charts

Check ID: `mathworks.maab.db_0151`

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0151: State machine patterns for transition actions in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0151: State machine patterns for transition actions.
- “Syntax for States and Transitions”

Check for MATLAB expressions in Stateflow charts

Check ID: `mathworks.maab.db_0127`

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

- Applies only to Stateflow charts that use C as the action language.
- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0127: MATLAB commands in Stateflow in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0127: MATLAB commands in Stateflow.
- “Access Built-In MATLAB Functions and Workspace Data” in the Stateflow documentation.

Check for indexing in blocks

Check ID: `mathworks.maab.db_0112`

Check that blocks use consistent vector indexing.

Description

Check that blocks use consistent vector indexing. When possible, use zero-based indexing to improve code efficiency.

Available with Simulink Verification and Validation.

The check verifies consistent indexing for the following objects:

Object	Indexing
• Assignment block • For Iterator block • Find block • Multiport Switch block • Selector block	• Zero-based indexing ([0, 1, 2, ...]) • One-based indexing ([1, 2, 3,...])
• Stateflow charts with C action language	Zero-based indexing ([0, 1, 2, ...])
• MATLAB Function block • Fcn block • MATLAB System blocks • Truth tables • State transition tables • Stateflow charts with MATLAB action language • MATLAB functions inside Stateflow charts	One-based indexing ([1, 2, 3,...])

Results and Recommended Actions

Condition	Recommended Action
Objects in your model use one-based indexing, but can be configured for zero-based indexing.	Configure objects for zero-based indexing.
Objects in your model use inconsistent indexing.	If possible, configure objects for zero-based indexing. If your model contains objects that cannot be configured for zero-based indexing, configure objects for one-based indexing.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0112: Indexing in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0112: Indexing.

Check file names

Check ID: `mathworks.maab.ar_0001`

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

- MAAB guideline, Version 3.0 limitation: The check does not flag conflicts with C++ keywords.
- Runs on library models.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: ar_0001: Filenames in the Simulink documentation.

- JMAAB guideline, Version 4.0: ar_0001: Usable characters for filenames.

Check folder names

Check ID: `mathworks.maab.ar_0002`

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

- Runs on library models.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: ar_0002: Directory names in the Simulink documentation.
- JMAAB guideline, Version 4.0: ar_0002: Usable characters for folder names.

Check for prohibited blocks in discrete controllers

Check ID: `mathworks.maab.jm_0001`

Check for prohibited blocks in discrete controllers.

Description

The check identifies continuous blocks in discrete controller models.

Available with Simulink Verification and Validation.

Input Parameters

To change the list of blocks that the check flags, you can use the Model Advisor Configuration Editor.

1. Open the Model Configuration Editor and navigate to **Check for prohibited blocks in discrete controllers**.
2. In the **Input Parameters** pane, to:
   - Prohibit the blocks as specified in MAAB 3.0, from **Standard**, select `MAAB 3.0`. The **Block type list** table provides the blocks that MAAB 3.0 prohibits inside controllers.
   - To specify blocks to either allow or prohibit, from **Standard**, select `Custom`. In **Treat blocktype list as**, select `Allowed` or `Prohibited`. In the **Block type list** table, you can add or remove blocks.
3. Click **Apply**.
4. Save the configuration. When you run the check using this configuration, the check uses the specified input parameters.

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. Use the Discretizing library, as described in “Discretize Blocks from the Simulink Model” in the Simulink documentation.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jm_0001: Prohibited Simulink standard blocks inside controllers in the Simulink documentation.
- JMAAB guideline, Version 4.0: jm_0001: Prohibited Simulink standard blocks inside controllers.
- “Overview of the Model Advisor Configuration Editor”

Check for prohibited sink blocks

Check ID: `mathworks.maab.hd_0001`

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 in controller models.

Available with Simulink Verification and Validation.

Input Parameters

To change the list of blocks that the check flags, you can use the Model Advisor Configuration Editor.

1. Open the Model Configuration Editor and navigate to **Check for prohibited sink blocks**.
2. In the **Input Parameters** pane, to:
   - Prohibit the blocks as specified by MAAB 3.0, from **Standard**, select `MAAB 3.0`. The **Block type list** table provides the sink blocks that MAAB 3.0 prohibits.
   - To specify blocks to either allow or prohibit, from **Standard**, select `Custom`. In **Treat blocktype list as**, select `Allowed` or `Prohibited`. In the **Block type list** table, you can add or remove blocks.
3. Click **Apply**.
4. Save the configuration. When you run the check using this configuration, the check uses the specified input parameters.

Results and Recommended Actions

Condition	Recommended Action
Sink blocks are not permitted in discrete controllers.	Remove sink blocks from the model.

Capabilities and Limitations

- Runs on library models.

- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: hd_0001: Prohibited Simulink sinks in the Simulink documentation.
- JMAAB guideline, Version 4.0: hd_0001: Prohibited Simulink sinks.
- “Overview of the Model Advisor Configuration Editor”

Check positioning and configuration of ports

Check ID: `mathworks.maab.db_0042`

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.	• If the duplicate Inport blocks are in a subsystem, remove them where possible. • If the duplicate Inport blocks are at the root level, remove them.

Capabilities and Limitations

- Runs on library models.

- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0042: Port block in Simulink models in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0042: Port block in Simulink models.

Check for matching port and signal names

Check ID: `mathworks.maab.jm_0010`

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, Version 3.0, 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

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jm_0010: Port block names in Simulink models in the Simulink documentation.

Check whether block names appear below blocks

Check ID: `mathworks.maab.db_0142`

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

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0142: Position of block names in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0142: Position of block names.

Check for mixing basic blocks and subsystems

Check ID: `mathworks.maab.db_0143`

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 nonempty string, the Model Advisor treats the subsystem as a basic block.

Available with Simulink Verification and Validation.

Input Parameters

To change the list of blocks that the check flags, you can use the Model Advisor Configuration Editor.

1. Open the Model Configuration Editor and navigate to **Check for mixing basic blocks and subsystems**.
2. In the **Input Parameters** pane, to:
   - Allow the blocks specified by MAAB 3.0, from **Standard**, select `MAAB 3.0`. The **Block type list** table provides the blocks that MAAB 3.0 allows at any model level.
   - To specify blocks to either allow or prohibit, from **Standard**, select `Custom`. In **Treat blocktype list as**, select `Allowed` or `Prohibited`. In the **Block type list** table, you can add or remove blocks.
3. Click **Apply**.
4. Save the configuration. When you run the check using this configuration, the check uses the specified input parameters.

Results and Recommended Actions

Condition	Recommended Action
A level in the model includes subsystem blocks and primitive blocks.	Move nonvirtual blocks into the subsystem.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0143: Similar block types on the model levels in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0143: Similar block types on the model levels.
- “Overview of the Model Advisor Configuration Editor”

Check for unconnected ports and signal lines

Check ID: `mathworks.maab.db_0081`

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

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0081: Unconnected signals, block inputs and block outputs in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0081: Unconnected signals, block inputs and block outputs.

Check position of Trigger and Enable blocks

Check ID: `mathworks.maab.db_0146`

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 at the top of the subsystem diagram.	Move the Trigger, Enable, and Action Port blocks to the top of the subsystem diagram.

Capabilities and Limitations

- JMAAB guideline, Version 4.0 limitation: The check does not verify that For Each or For Iterator blocks are uniformly located.
- Runs on library models.
- Analyzes content of library linked blocks.
- Does not analyze content in masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0146: Triggered, enabled, conditional Subsystems in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0146: Triggered, enabled, conditional Subsystems.

Check usage of tunable parameters in blocks

Check ID: `mathworks.maab.db_0110`

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

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not evaluate mask parameters.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0110: Tunable parameters in basic blocks in the Simulink documentation.

- JMAAB guideline, Version 4.0: db_0110: Tunable parameters in basic blocks.

Check Stateflow data objects with local scope

Check ID: `mathworks.maab.db_0125`

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

- JMAAB guideline, Version 4.0 limitation: The check does not detect if local data has the same name within charts or states that have parent-child relationships.
- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: db_0125: Scope of internal signals and local auxiliary variables in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0125: Scope of internal signals and local auxiliary variables.

Check for Strong Data Typing with Simulink I/O

Check ID: `mathworks.maab.db_0122`

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 **Use Strong Data Typing with Simulink I/O** check box for the specified block.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0122: Stateflow and Simulink interface signals and parameters in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0122: Stateflow and Simulink interface signals and parameters.
- “Syntax for States and Transitions”

Check usage of exclusive and default states in state machines

Check ID: `mathworks.maab.db_0137`

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, Version 3.0, for this check is db_0149: Flow chart 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, add another exclusive (OR) state, or replace the state with a flow chart.
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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: db_0137: States in state machines in the Simulink documentation.

Check Implement logic signals as Boolean data (vs. double)

Check ID: `mathworks.maab.jc_0011`

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, Version 3.0, for this check is na_0002: Appropriate implementation of fundamental logical and numerical operations.

Results and Recommended Actions

Condition	Recommended Action
Configuration setting for **Implement logic signals as boolean data (vs. double)** is not set.	Select the **Implement logic signals as boolean data (vs. double)** check box in the Configuration Parameters dialog box **All Parameters** pane.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: jc_0011: Optimization parameters for Boolean data types in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0011: Optimization parameters for Boolean data types.

Check model diagnostic parameters

Check ID: `mathworks.maab.jc_0021`

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 Outport 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
Algebraic loop is set to `none`.	Set **Algebraic loop** on the **Diagnostics** > **Solver** pane in 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.
Minimize algebraic loop is set to `none`.	Set **Minimize algebraic loop** on the **Diagnostics** > **Solver** pane in the Configuration Parameters dialog box to `error` or `warning`. Otherwise, Simulink might attempt to automatically break the algebraic loops for reference models and atomic subsystems, which

Condition	Recommended Action
	can impact the execution order for those models or subsystems.
Inf or NaN block output is set to `none`, which can result in numerical exceptions in the generated code.	Set **Inf or NaN block output** on the **Diagnostics** > **Data Validity** > **Signals** pane in the Configuration Parameters dialog box to `error` or `warning`.
Duplicate data store names is set to `none`, which can result in nonunique variable naming in the generated code.	Set **Duplicate data store names** on the **Diagnostics** > **Data Validity** > **Signals** pane in the Configuration Parameters dialog box to `error` or `warning`.
Unconnected block input ports is set to `none`, which prevents code generation.	Set **Unconnected block input ports** on the **Diagnostics** > **Data Validity** > **Signals** pane in the Configuration Parameters dialog box to `error` or `warning`.
Unconnected block output ports is set to `none`, which can lead to dead code.	Set **Unconnected block output ports** on the **Diagnostics** > **Data Validity** > **Signals** pane in the Configuration Parameters dialog box to `error` or `warning`.
Unconnected line is set to `none`, which prevents code generation.	Set **Unconnected line** on the **Diagnostics** > **Connectivity** > **Signals** pane in the Configuration Parameters dialog box to `error` or `warning`.
Unspecified bus object at root Outport block is set to `none`, which can lead to an unspecified interface if the model is referenced from another model.	Set **Unspecified bus object at root Outport block** on the **Diagnostics** > **Connectivity** > **Buses** pane in the Configuration Parameters dialog box to `error` or `warning`.
Mux blocks used to create bus signals is set to `none`, which can lead to creating an unintended bus in the model.	Set **Mux blocks used to create bus signals** on the **Diagnostics** > **Connectivity** > **Buses** pane in the Configuration Parameters dialog box to `error` or `warning`.
Element name mismatch is set to `none`, which can lead to an unintended interface in the generated code.	Set **Element name mismatch** on the **Diagnostics** > **Connectivity** > **Buses** pane in the Configuration Parameters dialog box to `error` or `warning`.

Condition	Recommended Action
Invalid function-call connection is set to `none`, which can lead to an error in the operation of the generated code.	Set **Invalid function-call connection** on the **Diagnostics** > **Connectivity** > **Function calls** pane in the Configuration Parameters dialog box to `error` or `warning`. This condition can lead to an error in the operation of the generated code.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: jc_0021: Model diagnostic settings in the Simulink documentation.

Check the display attributes of block names

Check ID: `mathworks.maab.jc_0061`

Check the display attributes of subsystem and block names.

Description

When the subsystem and block names provide descriptive information, display the names. If the block function is known from its appearance, do not display the name. Blocks with names that are obvious from the block appearance:

- From
- Goto
- Ground
- Logic
- MinMax
- ModelReference
- MultiPortSwitch
- Product
- Relational Operator
- Saturate
- Switch
- Terminator
- Trigonometry
- Unit Delay
- Sum
- Compare To Constant
- Compare To Zero

Available with Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Name is displayed and obvious from the block appearance.	Hide name by clearing **Diagram** > **Format** > **Show Block Name**.

Condition	Recommended Action
Name is not descriptive. Specifically, the block name is: • Not obvious from the block appearance. • The default name appended with an integer.	Modify the name to be more descriptive or hide the name by clearing **Diagram > Format > Show Block Name**.
Name is descriptive and not displayed. Descriptive names are: • Provided for blocks that are not obvious from the block appearance. • Not a default name appended with an integer.	Display the name by selecting **Diagram > Format > Show Block Name**

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0061: Display of block names in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0061: Display of block names.

Check display for port blocks

Check ID: `mathworks.maab.jc_0081`

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 **Icon display** setting is not set.	Set the **Icon display** to `Port number` for the specified Inport and Outport blocks.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: jc_0081: Icon display for Port block in the Simulink documentation.

Check subsystem names

Check ID: `mathworks.maab.jc_0201`

Check whether subsystem block names include invalid characters.

Description

The names of all subsystem blocks that generate code are checked for invalid characters.

The check does not report invalid characters in subsystem names for:

- Virtual subsystems
- Atomic subsystems with **Function Packaging** set to `Inline`

Available with Simulink Verification and Validation.

Input Parameters

To control the naming convention for blocks that the check flags, you can use the Model Advisor Configuration Editor.

1. Open the Model Configuration Editor and navigate to **Check port block names**. In the **Input Parameter** pane:

   - Use **Naming standard** to select `MAAB 3.0` or `Custom`. When you select `MAAB 3.0`, the check uses the regular expression `([^a-zA-Z_0-9])|(^\d)|(^ )|(__)|(^_)|(_$)` to verify that names:

     - Use these characters: `a-z`, `A-Z`, `0-9`, and the underscore `(_)`.
     - Do not start with a number.
     - Do not use underscores at the beginning or end of a string.
     - Do not use more than one consecutive underscore.

     When you select `Custom`, you can enter your own **Regular expression for prohibited names**. For example, if you want to allow more than one consecutive underscore, enter `([^a-zA-Z_0-9])|(^\d)|(^ )|(^_)|(_$)`.
2. Click **Apply**.
3. Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

Condition	Recommended Action
The subsystem names do not comply with the naming standard specified in the input parameters.	Update the subsystem names to comply with your own guidelines or the MAAB guidelines.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Tips

Use underscores to separate parts of a subsystem name instead of spaces.

See Also

- MAAB guideline, Version 3.0: jc_0201: Usable characters for Subsystem names in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0201: Usable characters for Subsystem names.

Check port block names

Check ID: `mathworks.maab.jc_0211`

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.

Input Parameters

To control the naming convention for blocks that the check flags, you can use the Model Advisor Configuration Editor.

1. Open the Model Configuration Editor and navigate to **Check port block names**. In the **Input Parameter** pane:

   - Use **Naming standard** to select `MAAB 3.0` or `Custom`. When you select `MAAB 3.0`, the check uses the regular expression `([^a-zA-Z_0-9])|(^\d)|(^ )|(__)|(^_)|(_$)` to verify that names:

     - Use these characters: `a-z`, `A-Z`, `0-9`, and the underscore `(_)`.
     - Do not start with a number.
     - Do not use underscores at the beginning or end of a string.
     - Do not use more than one consecutive underscore.

     When you select `Custom`, you can enter your own **Regular expression for prohibited names**. For example, if you want to allow more than one consecutive underscore, enter `([^a-zA-Z_0-9])|(^\d)|(^ )|(^_)|(_$)`.

2. Click **Apply**.
3. Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

Condition	Recommended Action
The block names do not comply with the naming standard specified in the input parameters.	Update the block names to comply with your own guidelines or the MAAB guidelines.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Tips

Use underscores to separate parts of a block name instead of spaces.

See Also

- MAAB guideline, Version 3.0: jc_0211: Usable characters for Inport blocks and Outport blocks in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0211: Usable characters for Inport block and Outport block.

Check character usage in signal labels

Check ID: `mathworks.maab.jc_0221`

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

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Does not allow exclusions of blocks or charts.

Tips

Use underscores to separate parts of a signal line name instead of spaces.

See Also

- MAAB guideline, Version 3.0: jc_0221: Usable characters for signal line names in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0222: Usable characters for signal line and bus names.

Check character usage in block names

Check ID: `mathworks.maab.jc_0231`

Check whether block names include invalid characters.

Description

The check reports invalid characters in all block names, except:

- Inports and Outports
- Unmasked subsystems

MAAB guideline, Version 3.0, jc_0231: Usable characters for block names does not apply to subsystem blocks.

Available with Simulink Verification and Validation.

Prerequisite

A prerequisite MAAB guideline, Version 3.0, for this check is jc_0201: Usable characters for Subsystem names.

Input Parameters

To control the naming convention for blocks that the check flags, you can use the Model Advisor Configuration Editor.

1 Open the Model Configuration Editor and navigate to **Check character usage in block names**. In the **Input Parameter** pane:

   - Use **Naming standard** to select `MAAB 3.0` or `Custom`. When you select `MAAB 3.0`, the check uses the regular expression `([^a-zA-Z_0-9\n\r ])|(^\d)|(^ )` to verify that names:

     - Use these characters: `a-z`, `A-Z`, `0-9`, underscore (_), and blank space.
     - Do not start with a number or blank space.
     - Do not have double byte characters.

     When you select `Custom`, you can enter your own **Regular expression for prohibited names**. For example, if you do not want to allow underscores (_) in a block name, enter `([^a-zA-Z0-9\r])|(^\d)|(^ )`.

2 Click **Apply**.

3 Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

Condition	Recommended Action
The block names do not comply with the naming standard specified in the input parameters.	Update the block names to comply with your own guidelines or the MAAB guidelines.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Tips

Carriage returns are allowed in block names.

See Also

- MAAB guideline, Version 3.0: jc_0231: Usable characters for block names in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0231: Usable characters for block names.

Check Trigger and Enable block names

Check ID: `mathworks.maab.jc_0281`

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

- JMAAB guideline, Version 4.0 limitation: This check only flags Trigger and Enable blocks names.
- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0281: Naming of Trigger Port block and Enable Port block in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0281: Naming of Trigger Port block and Enable Port block.

Check for Simulink diagrams using nonstandard display attributes

Check ID: `mathworks.maab.na_0004`

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 **View > Toolbar**.
Wide Nonscalar Lines is cleared.	Select **Display > Signals & Ports > Wide Nonscalar Lines**.
Viewer Indicators is cleared.	Select **Display > Signals & Ports > Viewer Indicators**.
Testpoint Indicators is cleared.	Select **Display > Signals & Ports > Testpoint & Logging Indicators**.
Port Data Types is selected.	Clear **Display > Signals & Ports > Port Data Types**.
Storage Class is selected.	Clear **Display > Signals & Ports > Storage Class**.
Signal Dimensions is selected.	Clear **Display > Signals & Ports > Signal Dimensions**.
Model Browser is selected.	Clear **View > Model Browser > Show Model Browser**.
Sorted Execution Order is selected.	Clear **Display > Blocks > Sorted Execution Order**.
Model Block Version is selected.	Clear **Display > Blocks > Block Version for Referenced Models**.
Model Block I/O Mismatch is selected.	Clear **Display > Blocks > Block I/O Mismatch for Referenced Models**.

Condition	Recommended Action
Library Links is set to **Disabled**, **User Defined** or **All**.	Select **Display > Library Links > None**.
Linearization Indicators is cleared.	Select **Display > Signals & Ports > Linearization Indicators**.
Block backgrounds are not white.	Blocks should have black foregrounds with white backgrounds. Click the specified block and select **Format > Foreground Color > Black** and **Format > Background Color > White**.
Diagrams do not have white backgrounds.	Select **Diagram > Format > Canvas Color > White**.
Diagrams do not have zoom factor set to 100%.	Select **View > Zoom > Normal (100%)**.

Action Results

Clicking **Modify** updates the display attributes to conform to the guideline.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: na_0004: Simulink model appearance in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0004: Simulink model appearance.

Check MATLAB code for global variables

Check ID: `mathworks.maab.na_0024`

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: • MATLAB code in MATLAB Function blocks • MATLAB functions defined in Stateflow charts • Called MATLAB functions	Replace global variables with signal lines, function arguments, or persistent data.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

MAAB guideline, Version 3.0: na_0024: Global Variables in the Simulink documentation.

- MAAB guideline, Version 3.0: na_0024: Global Variables in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0024: Global variable.

Check visibility of block port names

Check ID: `mathworks.maab.na_0005`

Check the visibility of port block names.

Description

An organization applying the MAAB guideline, Version 3.0, must select one of the following alternatives to enforce:

- The names 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 **All Port names should be shown (Format/Show Name)** 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 **All Port names should be shown (Format/Show Name)** 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 **Show port labels** to a value other than `none`.
Subsystem blocks show their port names.	Set the subsystem parameter **Show port labels** to `none`.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content in masked subsystems.

- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: na_0005: Port block name visibility in Simulink models in the Simulink documentation.

Check orientation of Subsystem blocks

Check ID: `mathworks.maab.jc_0111`

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

- JMAAB guideline, Version 4.0 limitation: The check does not flag the rotation of subsystems.
- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0111: Direction of Subsystem in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0111: Direction of Subsystem.

Check usage of Relational Operator blocks

Check ID: `mathworks.maab.jc_0131`

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

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0131: Use of Relational Operator block in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0131: Use of Relational Operator block.

Check usage of Switch blocks

Check ID: `mathworks.maab.jc_0141`

Check usage of Switch blocks.

Description

Verifies that the Switch block 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 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 **Criteria for passing first input** to u2 ~=0.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0141: Use of the Switch block in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0141: Use of the Switch block.
- Switch block

Check usage of buses and Mux blocks

Check ID: `mathworks.maab.na_0010`

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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: na_0010: Grouping data flows into signals in the Simulink documentation.
- “Composite Signals”

Check for bitwise operations in Stateflow charts

Check ID: `mathworks.maab.na_0001`

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 **Enable C-bit operations** 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 **Enable C-bit operations** cleared use bitwise operators (&, |, and ^).	To fix this issue, do either of the following: • Modify the expressions to replace bitwise operators. • If not using Boolean data types, consider enabling bitwise operations. In the Chart properties dialog box, select **Enable C-bit operations**.

Capabilities and Limitations

- Applies only to charts that use C as the action language.
- Does not run on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.

- Allows exclusions of blocks and charts.

See Also

- "Binary and Bitwise Operations" in the Stateflow documentation.
- MAAB guideline, Version 3.0: na_0001: Bitwise Stateflow operators in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0001: Bitwise Stateflow operators.
- "hisf_0003: Usage of bitwise operations" in the Simulink documentation.

Check for comparison operations in Stateflow charts

Check ID: `mathworks.maab.na_0013`

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

- Does not run on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: na_0013: Comparison operation in Stateflow in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0013: Comparison operation in Stateflow.

Check for unary minus operations on unsigned integers in Stateflow charts

Check ID: `mathworks.maab.jc_0451`

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

- Does not run on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0451: Use of unary minus on unsigned integers in Stateflow in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0451: Use of unary minus on unsigned integers in Stateflow.

Check for equality operations between floating-point expressions in Stateflow charts

Check ID: `mathworks.maab.jc_0481`

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

- Does not run on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: jc_0481: Use of hard equality comparisons for floating point numbers in Stateflow in the Simulink documentation.

Check input and output settings of MATLAB Functions

Check ID: `mathworks.maab.na_0034`

Identify MATLAB Functions that have inputs, outputs or parameters with inherited complexity or data type properties.

Description

The check identifies MATLAB Functions with inherited complexity or data type properties. A results table provides links to MATLAB Functions 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 Functions have inherited interfaces.	Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Function identified in the results. If applicable, using the "MATLAB Function Block Editor", make the following modifications in the "Ports and Data Manager": • Change **Complexity** from `Inherited` to `On` or `Off`. • Change **Type** from `Inherit: Same as Simulink` to an explicit type. • Change **Size** from `-1 (Inherited)` to an explicit size.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.

- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: na_0034: MATLAB Function block input/output settings in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0034: MATLAB Function block input/output settings.

Check MATLAB Function metrics

Check ID: `mathworks.maab.himl_0003`

Display complexity and code metrics for MATLAB Functions. Report metric violations.

Description

This check provides complexity and code metrics for MATLAB Functions. The check additionally reports metric violations.

A results table provides links to 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 violates the complexity input parameters.	For the MATLAB Function: • If effective lines of code is too high, further divide the MATLAB Function. • If comment density is too low, add comment lines. • If cyclomatic complexity per function is too high, further divide the MATLAB Function.

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: na_0016: Source lines of MATLAB Functions in the Simulink documentation.
- MAAB guideline, Version 3.0: na_0018: Number of nested if/else and case statement in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0016: Source lines of MATLAB Functions.
- JMAAB guideline, Version 4.0: na_0018: Number of nested if/else and case statement.

Check for mismatches between names of Stateflow ports and associated signals

Check ID: `mathworks.maab.db_0123`

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. The check does not flag name mismatches for reusable Stateflow charts in libraries.

Available with Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Signals have names that differ from the corresponding Stateflow ports.	Change the names of either the signals or the Stateflow ports.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts. Exclusions will not work for library linked charts.

See Also

- MAAB guideline, Version 3.0: db_0123: Stateflow port names in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0123: Stateflow port names.

Check scope of From and Goto blocks

Check ID: `mathworks.maab.na_0011`

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.	• Make sure that the ports are connected. • Change the scope of the specified blocks to local.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: na_0011: Scope of Goto and From blocks in the Simulink documentation.

MISRA C:2012 Checks

In this section...

Check usage of Assignment blocks

Check ID: `mathworks.misra.AssignmentBlocks`

Identify Assignment blocks that do not have block parameter **Action if any output element is not assigned** set to `Error` or `Warning`.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
The model or subsystem might contain Assignment blocks with incomplete array initialization that do not have block parameter **Action if any output element is not assigned** set to `Error` or `Warning`.	Set block parameter **Action if any output element is not assigned** to one of the recommended values: • `Error`, if Assignment block is not in an Iterator subsystem. • `Warning`, if Assignment block is in an Iterator subsystem.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- If you have a Simulink Verification and Validation license, allows exclusions of blocks and charts.

See Also

- MISRA C:2012, Rule 9.1
- "hisl_0029: Usage of Assignment blocks"

  "MISRA C Guidelines" in the Embedded Coder documentation.
- "MISRA C:2012 Compliance Considerations"

Check for blocks not recommended for MISRA C:2012

Check ID: `mathworks.misra.BlkSupport`

Identify blocks that are not supported or recommended for MISRA C:2012 compliant code generation.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Blocks that are not supported or recommended for MISRA C:2012 compliant code generation were found in the model or subsystem. For a list of blocks, see "hisl_0020: Blocks not recommended for MISRA C:2012 compliance".	Consider replacing the specified blocks.

Condition	Recommended Action
Lookup Table blocks using cubic spline interpolation or extrapolation methods were found in the model or subsystem.	Consider other interpolation and extrapolation methods for the Lookup Table blocks.
Deprecated Lookup Table blocks were found in the model or subsystem.	Consider replacing the deprecated Lookup Table blocks.
S-Function Builder blocks were found in the model or subsystem.	Consider replacing the S-Function Builder blocks by blocks recommended for production.

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check if you have a Simulink Verification and Validation license.

See Also

- "hisl_0020: Blocks not recommended for MISRA C:2012 compliance"
- "MISRA C Guidelines" in the Embedded Coder documentation.
- "MISRA C:2012 Compliance Considerations"
- "What Is a Model Advisor Exclusion?"

Check for unsupported block names

Check ID: `mathworks.misra.BlockNames`

Identify block names containing `/`.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Block names containing / were found in the model or subsystem.	Remove / from the block name.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- If you have a Simulink Verification and Validation license, allows exclusions of blocks and charts.

See Also

- MISRA C:2012, Rule 3.1
- "MISRA C Guidelines" in the Embedded Coder documentation.
- "MISRA C:2012 Compliance Considerations"

Check configuration parameters for MISRA C:2012

Check ID: `mathworks.misra.CodeGenSettings`

Identify configuration parameters that might impact MISRA C:2012 compliant code generation.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Model Verification block enabling is set to `Use local settings` or `Enable All`.	In the Configuration Parameters dialog box, on the **All Parameters** tab, set **Model Verification block enabling** to `Disable All`.

Condition	Recommended Action
System target file is set to a GRT-based target.	In the Configuration Parameters dialog box, on the **Code Generation** > **General** pane, set **System target file** to an ERT-based target.
Code Generation > **Interface** parameters are not set to the recommended values.	In the Configuration Parameters dialog box, on the **Code Generation** > **Interface** pane: • Set **Code replacement library** to `None` or `AUTOSAR 4.0` • Set **Shared code placement** to `Shared location` • Clear **Support: non-finite numbers** • Clear **Support: continuous time** (ERT-based target only) In the Configuration Parameters dialog box, on the **All Parameters** tab: • Clear **Support non-inlined S-functions** (ERT-based target only) • Clear **MAT-file logging**
Parenthesis level is not set to `Maximum (Specify precedence with parentheses)`.	In the Configuration Parameters dialog box, on the **Code Generation** > **Code Style** pane, set **Parentheses level** to `Maximum (Specify precedence with parentheses)`.
Maximum identifier length is not set to `31`.	In the Configuration Parameters dialog box, on the **Code Generation** > **Symbols** pane, set **Maximum identifier length** to `31`.
Casting Modes is not set to `Standards Compliant`.	In the Configuration Parameters dialog box, on the **Code Generation** > **Code Style** pane, set **Casting Modes** to `Standards Compliant`.

Condition	Recommended Action
`GenerateSharedConstants` is set to `on`.	Use `get_param` to set `GenerateSharedConstants` to `off`.
System-generated identifiers is set to `Classic`.	In the Configuration Parameters dialog box, on the **Code Generation** > **Symbols** pane, set **System-generated identifiers** to `Shortened`.
Pack Boolean data into bitfields is selected and **Bitfield declarator type specifier** is set to `uchar_T`.	In the Configuration Parameters dialog box, on the **Optimization** > **Signals and Parameters** pane, if **Pack Boolean data into bitfields** is selected, set **Bitfield declarator type specifier** to `uint_T`.
Signed integer division rounds to is not set to `Zero` or `Floor`.	In the Configuration Parameters dialog box, on the **Hardware Implementation** pane, set **Signed integer division rounds to** to `Zero` or `Floor`.
Use division for fixed-point net slope computation is not set to `on` or `Use division for reciprocals of integers only`.	In the Configuration Parameters dialog box, on the **Optimization** pane, set **Use division for fixed-point net slope computation** to `on` or `Use division for reciprocals of integers only`.
Replace multiplications by powers of two with signed bitwise shifts is selected.	In the Configuration Parameters dialog box, on the **Code Generation** > **Code Style** pane, Clear **Replace multiplications by powers of two with signed bitwise shifts**.
Allow right shifts on signed integers is selected.	In the Configuration Parameters dialog box, on the **Code Generation** > **Code Style** pane, Clear **Allow right shifts on signed integers**.

Action Results

Clicking **Modify All** changes the parameter values to the recommended values.

Capabilities and Limitations

This check does not review referenced models.

See Also

- "hisl_0060: Configuration parameters that improve MISRA C:2012 compliance"
- "hisl_0313: Selection of bitfield data types to improve MISRA C:2012 compliance"
- "MISRA C Guidelines" in the Embedded Coder documentation.
- "MISRA C:2012 Compliance Considerations"

Check for equality and inequality operations on floating-point values

Check ID: `mathworks.misra.CompareFloatEquality`

Identify equality and inequality operations on floating-point values.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications. The check flags sources causing equality or inequality operations on floating-point values.

The check does not flag blocks with equality or inequality operations on floating-point values if they are justified with a Polyspace® annotation. When you run the check, the **Blocks with justification** table lists blocks with equality or inequality operations that have a justification.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Model object has an equality or inequality operation on a floating-point value.	Consider using non-floating-point values for equality or inequality operations.

See Also

- MISRA C:2012, Dir 1.1
- "Annotate Blocks for Known Results" in the Polyspace Bug Finder™ documentation

Check for bitwise operations on signed integers

Check ID: `mathworks.misra.CompliantCGIRConstructions`

Identify Simulink blocks that contain bitwise operations on signed integers. The check does not flag MATLAB Function or Stateflow blocks that use signed operands for bitwise operators.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
The model or subsystem has blocks that contain bitwise operations on signed integers.	Consider using unsigned integers for bitwise operations.

See Also

- "hisl_0060: Configuration parameters that improve MISRA C:2012 compliance"
- "hisl_0313: Selection of bitfield data types to improve MISRA C:2012 compliance"
- "MISRA C:2012 Compliance Considerations"

Check for recursive function calls

Check ID: `mathworks.misra.RecursionCompliance`

Identify recursive function calls in Stateflow charts.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications. The check flags charts that have recursive function calls.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Chart has a recursive function call.	Remove recursive function call.

See Also

- MISRA C:2012, Dir 17.2
- "Guidelines for Avoiding Unwanted Recursion in a Chart"

Check for switch case expressions without a default case

Check ID: `mathworks.misra.SwitchDefault`

Identify switch case expressions that do not have a default case.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications. The check flags model objects that have switch case expressions without a default case.

The check does not flag blocks without default cases if they are justified with a Polyspace annotation. When you run the check, the **Blocks with justification** table lists blocks without default cases that have a justification.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

Condition	Recommended Action
Model object has a switch case expression without a default case.	For Switch Case blocks, consider selecting block parameter **Show default case** to explicitly specify a default case.

See Also

- MISRA C:2012, Rule 16.4
- "Annotate Blocks for Known Results" in the Polyspace Bug Finder documentation

Requirements Consistency Checks

In this section...

Identify requirement links with missing documents

Check ID: `mathworks.req.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.

Capabilities and Limitations

You can exclude blocks and charts from this check.

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

Check ID: `mathworks.req.Identifiers`

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.

Capabilities and Limitations

You can exclude blocks and charts from this check.

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

Check ID: `mathworks.req.Labels`

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 **Update** 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 **Edit/Add Links** from the **Requirements** menu, and use the Requirements dialog box that appears to synchronize the text.

Capabilities and Limitations

You can exclude blocks and charts from this check.

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 ID: `mathworks.req.Paths`

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
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 **Selection Linking** tab.	Change the preferred document file reference type or the specified paths by doing one of the following: • Click **Fix** to change the current path to the valid path. • In the model window, select **Analysis** > **Requirements** > **Settings**, select the **Selection Linking** tab, and change the value for the **Document file reference** option.

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.

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

"Maintenance of Requirements Links"

Identify IBM Rational DOORS objects linked from Simulink that do not link to Simulink

Identify IBM Rational DOORS objects that are targets of Simulink-to-DOORS requirements traceability links, but that have no corresponding DOORS-to-Simulink requirements traceability links.

Description

You have Simulink-to-DOORS links that do not have a corresponding link from DOORS to Simulink. You must be logged in to the IBM Rational DOORS Client to run this check.

Available with Simulink Verification and Validation.

Results and Recommended Actions

The Requirements Management Interface (RMI) examines Simulink-to-DOORS links to determine the presence of a corresponding return link. The RMI lists DOORS objects that do not have a return link to a Simulink object. For such objects, create corresponding DOORS-to-Simulink links:

1. Click the **FixAll** hyperlink in the RMI report to insert required links into the DOORS client for the list of missing requirements links. You can also create individual links by navigating to each DOORS item and creating a link to the Simulink object.
2. Re-run the link check.

Model Metric Checks

In this section...

Simulink block metric

Check ID: `mathworks.metricchecks.SimulinkBlockCount`

Display number of Simulink blocks in the model.

Description

Use this metric to calculate the number of blocks in the model. The results provide the number of blocks at the model and subsystem level.

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

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models.

See Also

- `sldiagnostics` in the Simulink documentation

Subsystem metric

Check ID: `mathworks.metricchecks.SubSystemCount`

Display number of subsystems in the model.

Description

Use this metric to calculate the number of subsystems in the model. The results provide the number of subsystems at the model and subsystem level.

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

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models.

See Also

- `sldiagnostics` in the Simulink documentation

Library link metric

Check ID: `mathworks.metricchecks.LibraryLinkCount`

Display number of library links in the model.

Description

Use this metric to calculate the number of library-linked blocks in the model. The results provide the number of library-linked blocks at the model and subsystem level.

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

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models.

See Also

- `sldiagnostics` in the Simulink documentation

Effective lines of MATLAB code metric

Check ID: `mathworks.metricchecks.MatlabLOCCount`

Display number of effective lines of MATLAB code.

Description

Run this metric to calculate the number of effective lines of MATLAB code. The results provide the number of effective lines of MATLAB code for each MATLAB function block and for MATLAB functions in Stateflow charts. Effective lines of MATLAB code are lines of executable code. Empty lines, lines that contain only comments, and lines that contain only an end statement are not considered effective lines of code.

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

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models.
- Does not analyze the content of MATLAB code in external files.

See Also

- `sldiagnostics` in the Simulink documentation

Stateflow chart objects metric

Check ID: `mathworks.metricchecks.StateflowChartObjectCount`

Display the number of Stateflow objects in each chart.

Description

Run this metric to calculate the number of Stateflow objects. For each chart in the model, the results provide the number of the following Stateflow objects:

- Atomic subcharts
- Boxes
- Data objects
- Events
- Graphical functions
- Junctions
- Linked charts
- MATLAB functions
- Notes
- Simulink functions
- States
- Transitions
- Truth tables

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

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models.

See Also

- `sldiagnostics` in the Simulink documentation

Lines of code for Stateflow blocks metric

Check ID: `mathworks.metricchecks.StateflowLOCCount`

Display the number of lines of code for Stateflow blocks.

Description

Use this metric to calculate the number of code lines for the following Stateflow blocks in the model.

- States
- Transitions
- Truth tables

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

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models.

See Also

- `sldiagnostics` in the Simulink documentation

Subsystem depth metric

Check ID: `mathworks.metricchecks.SubSystemDepth`

Display the subsystem depth of the model.

Description

Use this metric to calculate the subsystem depth of the model. The results provide the subsystem depth for each subsystem in the model.

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

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models.

See Also

- `sldiagnostics` in the Simulink documentation

Cyclomatic complexity metric

Check ID: `mathworks.metricchecks.CyclomaticComplexity`

Display the local and aggregated cyclomatic complexity of the model.

Description

Use this metric to calculate the cyclomatic complexity of the model. The results provide the local and aggregated cyclomatic complexity for the:

- Model
- Subsystems
- Charts
- States in charts
- MATLAB functions

Local complexity is the cyclomatic complexity for objects at their hierarchical level. Aggregated cyclomatic complexity is the cyclomatic complexity of an object and its descendants.

Running the metric compiles the model with coverage enabled. If block reduction is disabled for coverage, compilation can result in errors that do not occur during simulation. If there are compilation errors, the metric cannot report the cyclomatic complexity. To enable block reduction during coverage, in the Coverage Settings dialog box, clear **Force block reduction off**. Alternatively, set configuration parameter `CovForceBlockReductionOff` to `off`. When you select **Force block reduction off**, the software ignores the model configuration parameter **Block Reduction** (`BlockReduction`) setting during coverage collection.

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.
Model does not have cyclomatic complexity.	No action required.

Capabilities and Limitations

The metric:

- Does not run on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models. However, if a block contains a library-linked block, the metric does report the aggregated cyclomatic complexity of the library-linked block.

See Also

- `sldiagnostics` in the Simulink documentation
- "Cyclomatic Complexity for Stateflow Charts"
- "Specify Model Coverage Options"

Nondescriptive block name metric

Check ID: `mathworks.metricchecks.DescriptiveBlockNames`

Display nondescriptive Inport, Outport, and Subsystem block names.

Description

Run this metric to determine nondescriptive Inport, Outport, and Subsystem block names. Default names appended with an integer are nondescriptive block names. The results provide the nondescriptive block names at the model and subsystem level.

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

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models.

See Also

- `sldiagnostics` in the Simulink documentation

Data and structure layer separation metric

Check ID: `mathworks.metricchecks.LayerSeparation`

Display data and structure layer separation.

Description

Run this metric to calculate the data and structure layer separation. The results provide the separation at the model and subsystem level.

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

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of library-linked blocks or referenced models.

See Also

- MAAB 3.0 guideline db_0143: Similar block types on the model levels.
- `sldiagnostics` in the Simulink documentation

4

Model Metrics API

Model Metrics Results API

Instances of slmetric.metric.Result contain the metric data for a model component. The table summarizes the metric data for each of the available metrics. For more information about the model metric values, see “Model Metrics”.

MetricID	Value	AggregatedValue	Measures
`mathworks.metrics`	Number of blocks	Number of blocks for component and its descendents	Same as **Value**
`mathworks.metrics`	Number of subsystems	Number of subsystems for component and its descendents	Same as **Value**
`mathworks.metrics`	Number of library linked blocks	Number of library linked blocks for component and its descendents	Same as **Value**
`mathworks.metrics`	Number of effective lines of MATLAB code	Number of effective lines of MATLAB code for component and its descendents	Same as **Value**
`mathworks.metrics`	Number of Stateflow objects	Number of Stateflow objects for component and its descendents	Not applicable
`mathworks.metrics`	Number of Stateflow block code lines	Number of Stateflow block code lines for component and its descendents	Not applicable
`mathworks.metrics`	Subsystem level, starting from `AnalysisRoot`	Not applicable	Array [maximum depth starting from the component to its leaf nodes in the subsystem hierarchy, same as **Value**]

MetricID	Value	AggregatedValue	Measures
`mathworks.metrics`	Local cyclomatic complexity	Aggregated cyclomatic complexity	Not applicable
`mathworks.metrics`	Number of nondescriptive Inport, Outport, and Subsystem block names	Number of nondescriptive Inport, Outport, and Subsystem block names for component and its descendents	1-D vector [total number of Inport blocks, number of Inport blocks with nondescriptive names, total number of Outport blocks, number of Outport blocks with nondescriptive names, total number of Subsystem blocks, number of Subsystem blocks with nondescriptive names]
`mathworks.metrics`	Number of basic blocks on a structural level	Number of basic blocks on a structural level for component and its descendents	Not applicable

See Also

slmetric.Engine | slmetric.metric.ResultCollection

Related Examples

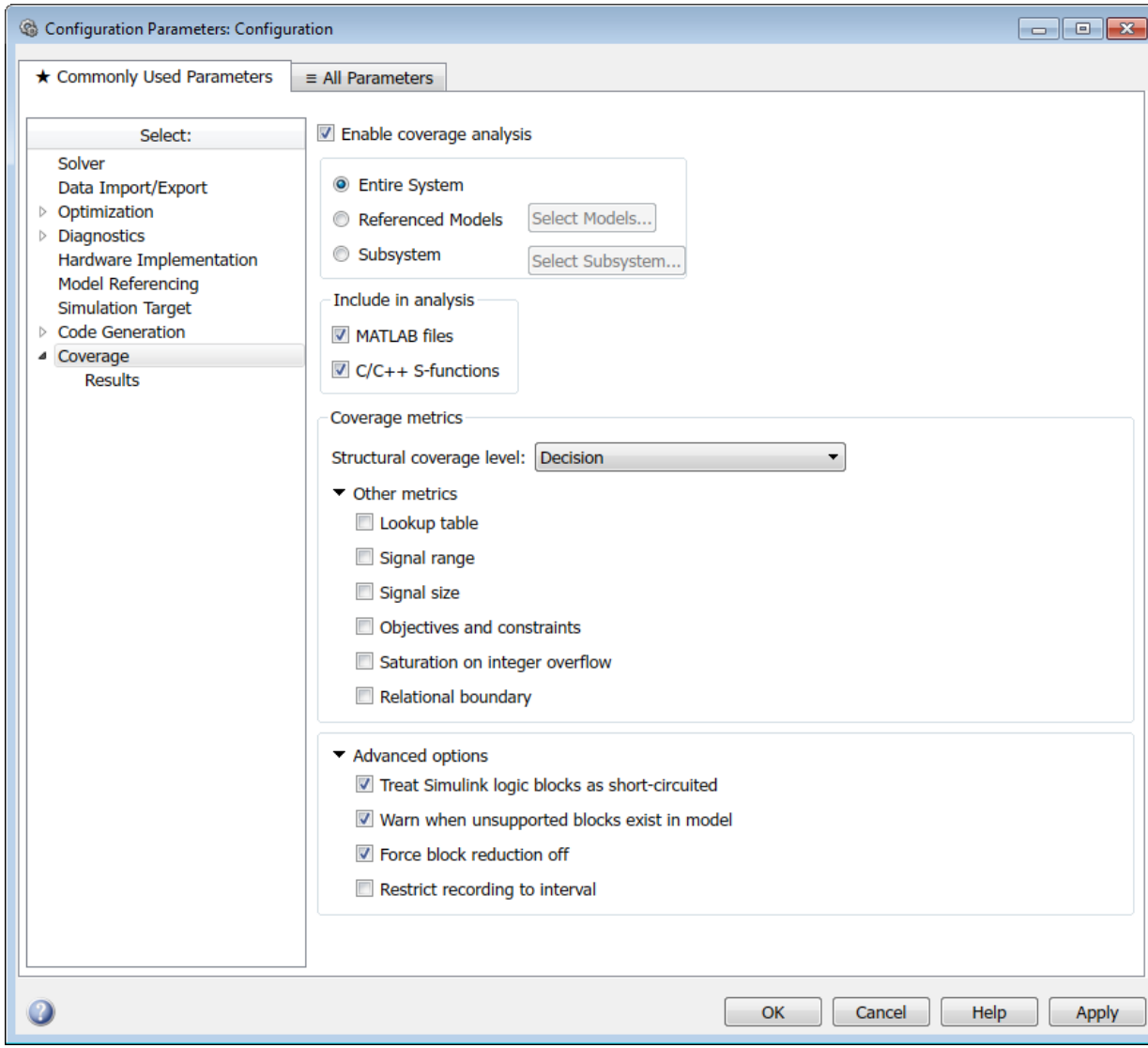
- “Collect Model Metrics Programmatically”

More About

- “Model Metrics”

SLCov CSH Entries

Coverage Pane



In this section...
“Coverage Pane Overview” on page 5-5

In this section...

In this section...

Coverage Pane Overview

Specify Simulink Verification and Validation coverage analysis options.

RecordCoverage

Command-Line Information

RecordCoverage	If RecordCoverage is set to on, Simulink collects and reports model coverage data during simulation. The format of this report is controlled by the values of the following parameters: CovCompData CovCumulativeReport CovCumulativeVarName CovHTMLOptions CovHtmlReporting CovMetricSettings CovModelRefEnable CovModelRefExcluded CovNameIncrementing CovPath CovReportOnPause CovSaveCumulativeToWorkSpaceVar CovSaveName CovSaveSingleToWorkspaceVar	'on' | {'off'}

	If set to `off`, model coverage data is not collected or reported. Set by **Enable coverage analysis** on the **Coverage** pane of the Configuration Parameters dialog box.	

CovPath

Command-Line Information

`CovPath`	Model path of the subsystem for which the Simulink Verification and Validation software gathers and reports coverage data. Set by selecting **Enable coverage analysis** on the **Coverage** pane of the Configuration Parameters dialog box and then clicking **Select Subsystem**.	`{'/'}`

CovCompData

Command-Line Information

`CovCompData`	If `CovHtmlReporting` is set to `on` and `CovCumulativeReport` is set to `on`, this parameter specifies `cvdata` objects containing additional model coverage data to include in the model coverage report. Set by **Additional data to include in report (cvdata objects)** on the **Reporting** pane of the Configuration Parameters dialog box.	`{''}`

CovMetricSettings

Command-Line Information

`CovMetricSettings`	Selects coverage metrics for a coverage report. Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box. Enable options `'s'` and `'w'` by selecting **Treat Simulink Logic blocks as short-circuited** and **Warn when unsupported blocks exist in model**, respectively, on the **Options** pane of the Configuration Parameters dialog box. Disable option `'e'` by selecting **Display coverage results using model coloring** on the **Results** pane of the Configuration Parameters dialog box.	`{'dw'}` Each order-independent character enables a coverage metric or option as follows: • `'d'` — Enable decision coverage • `'c'` — Enable condition coverage • `'m'` — Enable MCDC coverage • `'t'` — Enable lookup table coverage • `'r'` — Enable signal range coverage • `'z'` — Enable signal size coverage • `'o'` — Enable coverage for Simulink Design Verifier blocks • `'i'` — Enable saturation on integer overflow coverage • `'b'` — Enable relational boundary coverage • `'s'` — Treat Simulink logic blocks as short-circuited • `'w'` — Warn when unsupported blocks exist in model

		• `'e'` — Eliminate model coloring for coverage results

CovSaveOutputData

Option to automatically save coverage data results to file. Takes the following inputs:

```
{'on'} | 'off'
```

Enable Lookup Table metric

Enables the Lookup Table metric for coverage recording. For more information, see "Types of Model Coverage".

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Signal Range metric

Enables the Signal Range metric for coverage recording. For more information, see "Types of Model Coverage".

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Signal Size metric

Enables the Signal Size metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Objectives and Constraints (SLDV) metric

Enables the Objectives and Constraints (SLDV) metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Saturation on Integer Overflow metric

Enables the Saturation on Integer Overflow metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Relational Boundary metric

Enables the Relational Boundary metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

CovFilter

The full path of the filter file that specifies model objects that you want to exclude from model coverage collection during simulation. You can only use files that have the valid `.cvf` filter file format.

CovHTMLOptions

Command-Line Information

`CovHTMLOptions`	If `CovHtmlReporting` is set to `on`, use this parameter to select from a set of display options for the resulting model coverage report. Select these options in the **Reporting** tab of the Configuration Parameters dialog box.	Appended character sets separated by a space. HTML options are enabled or disabled through a value of 1 or 0, respectively, in the following character sets (default values shown): • `'-sRT=1'` — Show report • `'-sVT=0'` — Web view mode • `'-aTS=1'` — Include each test in the model summary • `'-bRG=1'` — Produce bar graphs in the model summary • `'-bTC=0'` — Use two color bar graphs (red, blue) • `'-hTR=0'` — Display hit/count ratio in the model summary • `'-nFC=0'` — Do not report fully covered model objects • `'-scm=1'` — Include cyclomatic complexity numbers in summary • `'-bcm=1'` — Include cyclomatic complexity numbers in block details

		• `'-xEv=0'` — Filter Stateflow events from report

CovForceBlockReductionOff

Command-Line Information

`CovForceBlockReduction(`	If `CovForceBlockReduction(` is set to `on`, the Simulink Verification and Validation software ignores the value of the Simulink **Block reduction** parameter. The software provides coverage data for every block in the model that collects coverage.	`{'on'} | 'off'`

CovEnable

Enables coverage analysis. For more information, see “Specify Model Coverage Options”.

CovEnableCumulative

Accumulates model coverage results from successive simulations. Set this and `CovSaveCumulativeToWorkspaceVar` to `on` to collect model coverage results for multiple simulations in one `cvdata` object. For more information, see “Cumulative Coverage Data”.

CovScope

Command-Line Information

`CovScope`	Determines the scope of coverage analysis. If set to `EntireSystem`, the coverage results include the entire system. If set to `ReferencedModels`, the coverage results only include the referenced models selected in the **Select Models for Coverage Analysis** dialog box. If set to `Subsystem`, the coverage results include the subsystems selected in the **Subsystem Selection**.	character array — `{'EntireSystem'} | 'ReferencedModels' | 'Subsystem'`

CovIncludeTopModel

Enable coverage analysis for the top-level model when recording coverage for referenced models. Enabled when `CovScope` is For more information, see “Specify Model Coverage Options”.

CovSaveCumulativeToWorkspaceVar

Command-Line Information

`CovSaveCumulativeTo-WorkspaceVar`	If set to `on`, the Simulink Verification and Validation software accumulates and saves the results of successive simulations in the workspace variable specified by `CovCumulativeVarName`. Set by **Save cumulative results in workspace variable** on the **Results** pane of the Configuration Parameters dialog box.	`{'on'} | 'off'`

CovCumulativeVarName

Command-Line Information

`CovCumulativeVarName`	If `CovSaveCumulativeToWorkspaceVar` is set to `on`, the Simulink Verification and Validation software saves the results of successive simulations in the workspace variable specified by this property. Set by **cvdata object name** below the selected **Save cumulative results in workspace variable** check box on the **Results** pane of the Configuration Parameters dialog box.	`{'covCumulativeData'}`

CovCumulativeReport

Command-Line Information

`CovCumulativeReport`	If `CovHtmlReporting` is set to `on`, this parameter allows the `CovCumulativeReport` and `CovCompData` parameters to specify the number of coverage results displayed in the model coverage report. If set to `on`, the Simulink Verification and Validation software displays the coverage results from successive simulations in the report. If set to `off`, the software displays the coverage results for the last simulation in the report. Set by the **Cumulative runs** (on) / **Last run** (off) options on the **Reporting** pane of the Configuration Parameters dialog box.	`'on' | {'off'}`

CovReportOnPause

Command-Line Information

`CovReportOnPause`	Specifies that when you pause during simulation, the model coverage report appears in updated form, with coverage results up to the current pause or stop time. Set by **Update results on pause** on the **Results** pane of the Configuration Parameters dialog box.	`{'on'} | 'off'`

CovModelRefEnable

Command-Line Information

`CovModelRefEnable`	If `CovModelRefEnable` is set to `on` or `all`, the Simulink Verification and Validation software generates coverage data for all referenced models. If `CovModelRefEnable` is set to `filtered`, coverage data is collected for all referenced models except those specified by the parameter `CovModelRefExcluded`. Set by **Referenced Models** on the **Coverage** pane of the Configuration Parameters dialog box.	`'on' | {'off'} | 'all' | 'filtered'`

CovModelRefExcluded

Command-Line Information

`CovModelRefExcluded`	If `CovModelRefEnable` is set to `filtered`, this parameter stores a comma-separated list of referenced models for which coverage is disabled. Set by selecting **Referenced Models** on the **Coverage** pane of the Configuration Parameters dialog box and then clicking **Select Models**.	`{''}`

CovExternalEMLEnable

Command-Line Information

`CovExternalEMLEnable`	Enables coverage for external MATLAB functions that MATLAB functions for code generation call in your model. The functions can be defined in a MATLAB Function block or in a Stateflow chart. Enable this feature by checking **Coverage for MATLAB Files** on the Configuration Parameters dialog box.	`'on' | {'off'}`

CovSFcnEnable

Command-Line Information

`CovSFcnEnable`	Enables coverage for C/C++ `S-Function` blocks in your model. Enable this feature by checking **Coverage for C/C++ S-Functions** on the Configuration Parameters dialog box. For more information, see "Model Coverage for C and C++ S-Functions" in Simulink Verification and Validation documentation.	`'on' | {'off'}`

CovMetricStructuralLevel

Sets the level of structural coverage recorded. For more information, see “Types of Model Coverage”.

CovBoundaryAbsTol

Boundary Tolerance — Absolute

Specifies the value of absolute tolerance for relational boundary coverage of floating point inputs. For more information, see “Relational Boundary Coverage”.

CovBoundaryRelTol

Boundary Tolerance — Relative

Specifies the value of relative tolerance for relational boundary coverage of floating point inputs. For more information, see “Relational Boundary Coverage”.

CovUseTimeInterval

Restrict recording to interval

To record model coverage only inside a specified simulation time interval, set`CovUseTimeInterval` to `'on'` and define a `CovStartTime` and `CovStopTime`. Model coverage is not recorded for simulation times outside `CovStartTime` and `CovStopTime`. If your simulation starts at a time greater than or equal to `CovStopTime`, model coverage is not recorded.

For example, you might want to restrict model coverage recording if your model has transient effects early in simulation, or if you need model coverage reported only for a particular model operation.

CovStartTime

Coverage Start Time

To record model coverage only inside a specified simulation time interval, set`CovUseTimeInterval` to `'on'` and define a `CovStartTime` and `CovStopTime`. Model coverage is not recorded for simulation times outside `CovStartTime` and `CovStopTime`. If your simulation starts at a time greater than or equal to `CovStopTime`, model coverage is not recorded.

For example, you might want to restrict model coverage recording if your model has transient effects early in simulation, or if you need model coverage reported only for a particular model operation.

CovStopTime

Coverage Stop Time

To record model coverage only inside a specified simulation time interval, set`CovUseTimeInterval` to `'on'` and define a `CovStartTime` and `CovStopTime`. Model coverage is not recorded for simulation times outside `CovStartTime` and `CovStopTime`. If your simulation starts at a time greater than or equal to `CovStopTime`, model coverage is not recorded.

For example, you might want to restrict model coverage recording if your model has transient effects early in simulation, or if you need model coverage reported only for a particular model operation.

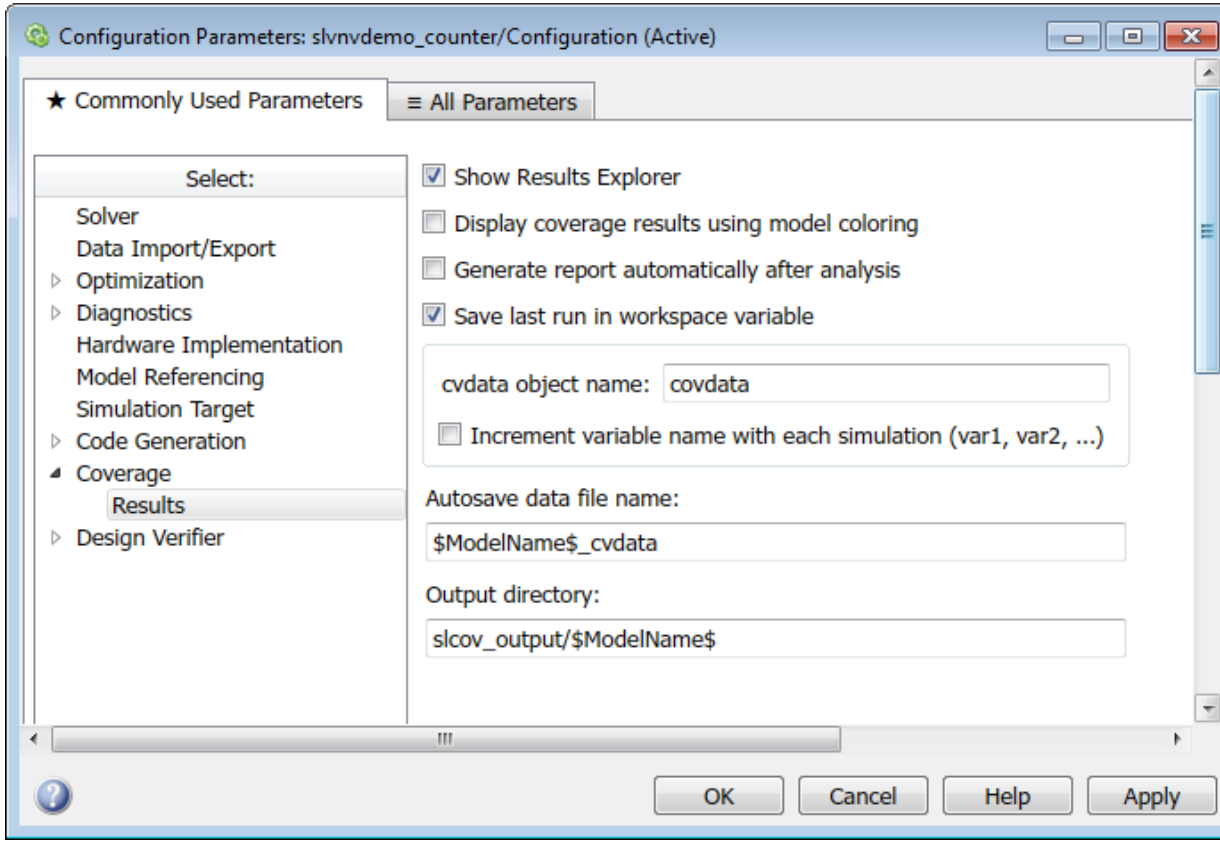
CovLogicBlockShortCircuit

Treat Simulink logic blocks as short-circuited.

CovUnsupportedBlockWarning

Warn when unsupported blocks exist in model.

Coverage Pane: Results



In this section...

In this section...

Coverage Results Pane Overview

Specify Simulink Verification and Validation coverage results options.

CovShowResultsExplorer

Option to show the Coverage Results Explorer after simulation. Takes the following inputs:

```
{'on'} | 'off'
```

CovHighlightResults

Display coverage results using model coloring.

CovHtmlReporting

Command-Line Information

`CovHtmlReporting`	Set to `on` to create an HTML report containing the coverage data at the end of simulation. Set by **Generate report automatically after analysis** on the **Reporting** pane of the coverage settings.	`{'on'} | 'off'`

CovSaveSingleToWorkspaceVar

Command-Line Information

`CovSaveSingleTo-WorkspaceVar`	If set to `on`, the Simulink Verification and Validation software saves the results of the last simulation run in the workspace variable specified by `CovSaveName`. Set by **Save last run in workspace variable** on the **Results** pane of the Configuration Parameters dialog box.	`{'on'} | 'off'`

CovSaveName

Name of the `cvdata` object saved in the workspace containing the results of the last simulation run.

CovNameIncrementing

Command-Line Information

`CovNameIncrementing`	If set to `on`, the Simulink Verification and Validation software appends numerals to the workspace variable names for each new result so that earlier results are not overwritten. To enable this parameter, enable `CovSaveSingleToWorkspa`	`{'on'} | 'off'`

CovDataFileName

Name of file to which coverage data results will automatically be saved.

CovOutputDir

Directory in which coverage output files will be saved.

6

Model Transformer Tasks

Model Transformer Tasks

In this section...

With the Model Transformer, you can refactor a model to reuse clones and implement variants. Clones are subsystems that have identical structure and parameter settings. You can use the Model Transformer to perform these tasks at once or one step at a time.

Transformations

The Model Transformer can perform the following transformations:

- Transform modeling patterns into Variant Source and Variant Subsystem blocks.
- Identify subsystem clones and replace them with library blocks.

The top-level folder contains the steps for both transformations. When you click **Run all**, the Model Transformer performs the steps for both transformations. The result is a model with the transformations and a library containing subsystem clones. The transformed model is in the folder that has the prefix `m2m` plus the original model name. The library is in your working folder.

If you want to run every step in the transformation, rather than running the steps individually, you can still specify input parameters. For those steps that have input parameters, specify the parameters and click **Apply**.

See Also

- "Transform Model to Variant System "
- "Enable Component Reuse with Clone Detection"

Transform the model to variant system

This folder contains the steps to transform a model to a variant system. The following transformations are possible:

- If an If block connects to one or more If Action Subsystems and each If Action Subsystem has one outport, replace this modeling pattern with a subsystem and a Variant Source block.
- If an If block connects to an If Action Subsystem that has no outport or two or more outports, replace this modeling pattern with a Variant Subsystem block.
- If a Switch Case block connects to one or more Switch Case Action Subsystems and each Switch Case Action Subsystem has one outport, replace this modeling pattern with a subsystem and a Variant Source block.
- If a Switch Case block connects to a Switch Case Action Subsystem that has no outport or two or more outports, replace this modeling pattern with a Variant Subsystem block.
- Replace a Switch block with a Variant Source block.
- Replace a Multiport Switch block that has two or more data ports with a Variant Source block.

Note: For some model patterns and settings, the Model Transformer cannot perform every one of the preceding transformations.

If you click **Run all**, the Model Transformer performs the three steps in the transformation. The result is a model that contains variant blocks. This model is in your working folder.

If you want to run every step in the transformation at once, rather than running the steps individually, you can still specify input parameters for those steps that have them.

See Also

- "Transform Model to Variant System "

1. Identify system constants for use in variant transformation

A system constant is the control input or is part of an arithmetic expression that forms the control input to Multiport Switch or Switch blocks and the inputs to If or Switch Case

blocks. The control input must be Constant blocks and some combination of blocks that form a supported MATLAB expression. In the Constant block parameters dialog box, the **Constant value** parameters are the system constants. In the transformed model, system constants are part of condition expressions in Variant Source or Variant Subsystem blocks.

When you click **Run This Task**, this step lists system constants that qualify to be part of condition expressions in Variant Source or Variant Subsystem blocks. For a system constant to qualify, it must be a scalar and a `Simulink.Parameter` object with one of these storage classes:

- `Define` with header file specified
- `ImportedDefine` with header file specified
- `CompilerFlag`
- `SystemConstant(AUTOSAR)`
- User-defined custom storage class that defines data as a macro in specified header file

After you run this task, in the results section, you can choose not to use a system constant in the variant transformation by clearing the check box next to it.

See Also

- "Transform Model to Variant System "

2. Identify blocks that qualify for variant transformation

When you click **Run This Task**, in the results section, this step lists modeling patterns that qualify for transformation into Variant Source and Variant Subsystem blocks. Each modeling pattern is a hyperlink to the corresponding location in the model. If you do not want the Model Transformer to perform a transformation, clear the check box next to the qualifying pattern.

See Also

- "Transform Model to Variant System "

3. Convert blocks to variants

When you click **Run This Task**, the Model Transformer creates a model with the blocks that you specified for variant transformation in the preceding step. The transformed model is in the folder that has the prefix `m2m` plus the original model name.

See Also

- “Transform Model to Variant System ”

Identify subsystem clones and replace them with library blocks

This folder contains the steps **1. Identify subsystem clones** and **2. Realize clones as library blocks**. If you click **Run all**, the Model Transformer performs both steps. The Model Transformer adds subsystem clones to a library and creates a model with links to these library blocks.

Two or more subsystems are clones if they have identical structure and parameter settings. Two clones do not have to be completely identical. Clones can have the following differences:

- For a parameter setting, one clone can have a symbol while the other clone has a numeric value, as long as the symbol evaluates to the same numeric value.
- Two clones can have a different sorted order.
- The length of signal lines and the location and size of blocks can be different as long as the block connections are the same.
- Blocks can have different names.

The Model Transformer detects clones across referenced model boundaries.

If you want to perform **Identify subsystem clones and replace them with library blocks** but you do not want to perform **Transform the model to variant system**, you must clear the check box next to **Transform the model to variant system**. If you want to perform both transformations, perform **Transform the model to variant system** first.

See Also

- “Enable Component Reuse with Clone Detection”

1. Identify subsystem clones

When you click **Run This Task**, the Model Transformer lists subsystem clones. Each subsystem clone is a hyperlink to the corresponding location in the model. If one clone already links to a library block, the Model Transformer reports a missing link for the other subsystem or subsystems.

If you do not want the Model Transformer to replace a subsystem with a link to a library block, you can clear the check box next to the subsystem.

See Also

- "Enable Component Reuse with Clone Detection"

2. Realize clones as library blocks

When you click **Run This Task**, the Model Transformer creates a library of subsystem clones and a model that links from the Subsystem blocks to these clones. The Model Transformer also replaces missing links from subsystem clones to library blocks. By default, the library file name is `syscloneLibFile` and the model name is the prefix `gen0_` plus the original model name. In the input parameters, you can specify another name or prefix.

See Also

- "Enable Component Reuse with Clone Detection"