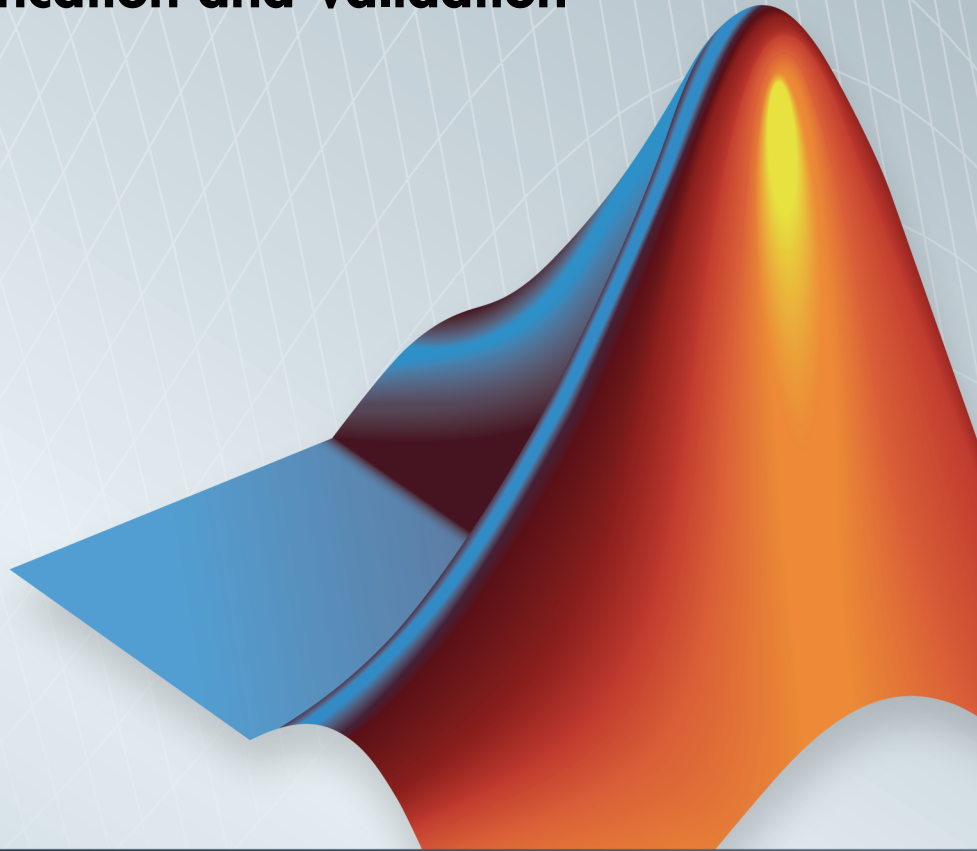


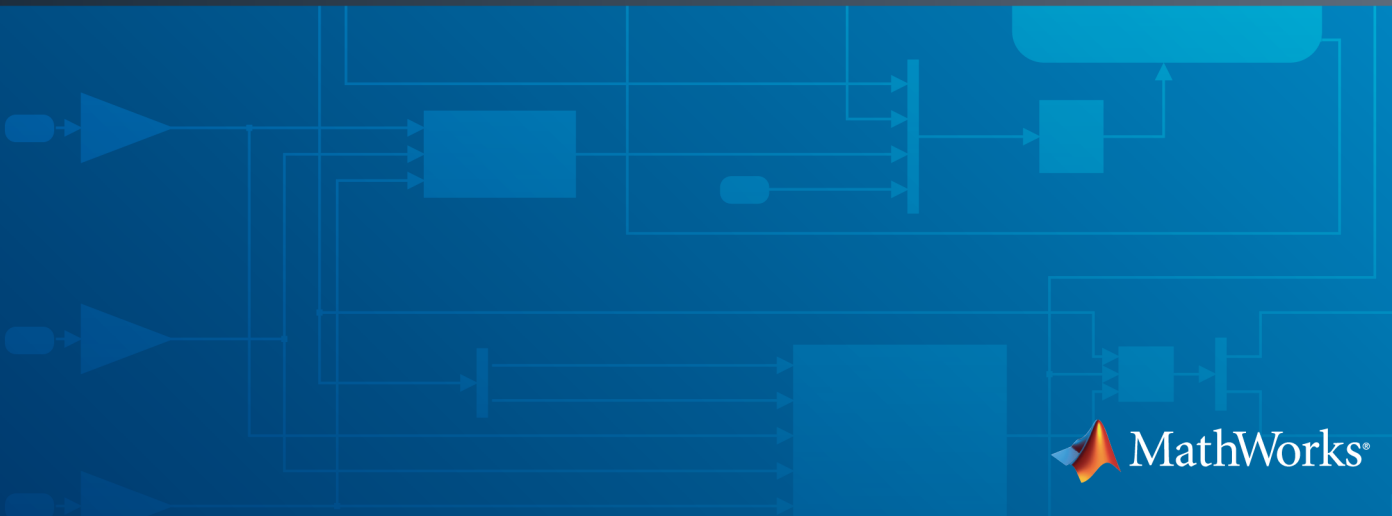
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Functions — Alphabetical List

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');
```

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

| | |
|----------------|---|
| <i>element</i> | Specifies an element to be added to a list in one of the following: <ul style="list-style-type: none">• Element• Cell array of elements. When you add a cell array to a list, they form different rows in the list.• String |
|----------------|---|

Examples

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

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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:

- String
- Element
- Cell array of elements

Examples

Add two lines of text:

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

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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 strings and objects to add to the table. The order of the items in the array determines which column the item is in. If you do not add data to the table, the Model Advisor does not display the table in the result.

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

Examples

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

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

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

end

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”
- “Format Model Advisor 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.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

string

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

Example: 'myDataFile.xml'

source — Name of model or configuration set

string | 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”

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”

allNames

Class: cv.cvdatabroup

Package: cv

Get names of all models associated with `cvdata` objects in `cv.cvdatabroup`

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.cvdatabroup` class.

Examples

Add three `cvdata` objects to `cvdg` and return a cell array of model names:

```
a = cvdata;  
b = cvdata;  
c = cvdata;  
cvdg = cv.cvdatabroup;  
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)
```

Description

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

Input Arguments

cvdo

`cvdata` object

object

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

| Object Specification | Description |
|--------------------------------|--|
| <code>BlockPath</code> | Full path to a model or block |
| <code>BlockHandle</code> | Handle to a model or block |
| <code>s1obj</code> | Handle to a Simulink [®] API object |
| <code>sfID</code> | Stateflow ID |
| <code>sfObj</code> | Handle to a Stateflow API object from a singly instantiated Stateflow chart |
| <code>{BlockPath, sfID}</code> | Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |

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

Output Arguments

complexity

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

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

| | |
|-------------------------------|--|
| <code>total_complexity</code> | Cyclomatic complexity coverage for object and its descendants (if any) |
| <code>local_complexity</code> | 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 dialog box to collect and display cyclomatic complexity coverage results in the coverage report:

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

More About

- “Cyclomatic Complexity”

See Also

conditioninfo | cvsim | decisioninfo | getCoverageInfo | mdcinfo |
sigrangeinfo | sigsizeinfo | tableinfo

conditioninfo

Retrieve condition coverage information from `cvdata` object

Syntax

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

Description

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

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

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

Input Arguments

cvdo

`cvdata` object

object

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

| | |
|--------------------------|--|
| <code>BlockPath</code> | Full path to a Simulink model or block |
| <code>BlockHandle</code> | Handle to a Simulink model or block |
| <code>s1obj</code> | Handle to a Simulink API object |
| <code>sfID</code> | Stateflow ID |

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

ignore_descendants

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

1 to ignore coverage of descendant objects

0 (default) to collect coverage of descendant objects

Output Arguments

coverage

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

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

description

A structure array with the following fields:

| | |
|-------------------|---|
| <code>text</code> | String describing a condition or the block port to which it applies |
|-------------------|---|

| | |
|------------------------|---|
| <code>trueCnts</code> | Number of times the condition was true in a simulation |
| <code>falseCnts</code> | Number of times the condition was false in a simulation |

Examples

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

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

Alternatives

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

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

More About

- “Condition Coverage (CC)”

See Also

complexityinfo | cvsim | decisioninfo | getCoverageInfo | mdcinfo |
overflowsaturationinfo | sigrangeinfo | sigsizeinfo | tableinfo

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.cvatagroup

Class: cv.cvatagroup

Package: cv

Create collection of cvdata objects for model reference hierarchy

Syntax

```
cvdg = cv.cvatagroup(cvdo1, cvdo2, ...)
```

Description

`cvdg = cv.cvatagroup(cvdo1, cvdo2, ...)` creates an instantiation of the `cv.cvatagroup` 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.cvatagroup` class and add two `cvdata` objects to it:

```
a = cvdata;  
b = cvdata;  
cvdg = cv.cvatagroup(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.

cvhtml

Produce HTML report from model coverage objects

Syntax

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

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`.

`cvhtml(file, cvdo1, cvdo2, ..., options, detail)` creates a combined coverage report for several `cvdata` objects and specifies the detail level of the report with the value of `detail`.

Input Arguments

cvdo

A `cv.cvdatagroup` object

detail

Specifies the level of detail in the report. Set **detail** to an integer from 0 to 3. Greater numbers for **detail** indicate greater detail.

Default: 2

file

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

Default: []

options

Specify the report options that you specify in **options**:

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

The following table lists all the options:

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

Examples

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

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

Alternatives

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

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

More About

- “Create HTML Reports with `cvhtml`”

See Also

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

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

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

Alternatives

Use the Coverage Settings dialog box to display model coverage results by coloring objects:

- 1 Open the model.
- 2 Select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** tab, select **Coverage for this model**.

- 4** On the **Results** tab, select **Display coverage results using model coloring**.
- 5** Click **OK** to close the Coverage Settings 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

cvsave

Save coverage tests and results to file

Syntax

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

Description

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

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

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

Input Arguments

filename

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

model

Handle to a Simulink model

cvto

`cvtest` object

cell_array

Cell array of cvtest objects

Examples

Save coverage results for the `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 `slvndemo_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 = 'slvndemo_ratelim_harness';
mdl_subsys = ...
    'slvndemo_ratelim_harness/Adjustable Rate Limiter';
open_system(mdl);
open_system(mdl_subsys);

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

```

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

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

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

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

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

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

Alternatives

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

- 1 Open the model for which you want to save cumulative coverage results.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.

- 3** On the **Coverage** tab, select **Coverage for this model**.
- 4** On the Results tab:
 - a** Select **Save cumulative results in workspace variable**.
 - b** Select **Save last run in workspace variable**.
- 5** Click **OK** to close the Coverage Settings dialog box and save your changes.
- 6** Simulate the model and review the results.

More About

- “Save Test Runs to File with cvsave”

See Also

cvload

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 string

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`

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 |
|--------------------------------------|--|
| <code>id</code> | Read-only internal ID |
| <code>modelcov</code> | Read-only internal ID |
| <code>rootPath</code> | Name of system or subsystem for analysis |
| <code>label</code> | String used when reporting results |
| <code>setupCmd</code> | Command executed in base workspace prior to simulation |
| <code>settings.condition</code> | Set to 1 for condition coverage. |
| <code>settings.decision</code> | Set to 1 for decision coverage. |
| <code>settings.designverifier</code> | Set to 1 for coverage for Simulink Design Verifier™ blocks. |
| <code>settings.mcdc</code> | Set to 1 for MCDC coverage. |
| <code>settings.relationalop</code> | Set to 1 for relational boundary coverage. Use <code>options.covBoundaryAbsTol</code> and <code>options.covBoundaryRelTol</code> for specifying tolerances for this coverage. For more information, see “Relational Boundary Coverage”. |
| <code>settings.sigrange</code> | Set to 1 for signal range coverage. |
| <code>settings.sigsize</code> | Set to 1 for signal size coverage. |
| <code>settings.tableExec</code> | Set to 1 for lookup table coverage. |
| <code>modelRefSettings.enable</code> | <ul style="list-style-type: none">• <code>'off'</code> — Disables coverage for all referenced models.• <code>'all'</code> or <code>on</code> — Enables coverage for all referenced models. |

| Field | Description |
|---|--|
| | <ul style="list-style-type: none"> 'filtered' — Enables coverage only for referenced models not listed in the <code>excludedModels</code> subfield. |
| <code>modelRefSettings.excludeTopModel</code> | Set to 1 to exclude coverage for the top model |
| <code>modelRefSettings.excludedModels</code> | String specifying a comma-separated list of referenced models for which coverage is disabled. |
| <code>emlSettings.enableExternal</code> | Set to 1 to enable coverage for external program files called by MATLAB functions in your model. |
| <code>options.forceBlockReduction</code> | Set to 1 to override the Simulink Block reduction parameter if it is enabled. |
| <code>options.covBoundaryRelTol</code> | Set to the value of relative tolerance for relational boundary coverage. For more information, see “Relational Boundary Coverage”. |
| <code>options.covBoundaryAbsTol</code> | Set to the value of absolute tolerance for relational boundary coverage. For more information, see “Relational Boundary Coverage”. |
| <code>options.useTimeInterval</code> | Set to 1 to restrict model coverage recording only inside a specified simulation time interval. For more information see “Specify Model Coverage Options”. |
| <code>options.intervalStartTime</code> | Value of the coverage recording interval start time. |
| <code>options.intervalStopTime</code> | Value of the coverage recording interval stop time. |
| <code>filter.fileName</code> | String specifying name of coverage filter file, if you have excluded objects from coverage recording. See “Coverage Filter Rules and Files”. |

Examples

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

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

More About

- “Create Tests with `cvtest`”

See Also

`cvsim` | `cv.cvdatabgroup`

decisioninfo

Retrieve decision coverage information from `cvdata` object

Syntax

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

Description

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

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

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

Input Arguments

cvdo

`cvdata` object

object

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

| Object Specification | Description |
|----------------------|-------------------------------|
| BlockPath | Full path to a model or block |

| Object Specification | Description |
|----------------------|---|
| BlockHandle | Handle to a model or block |
| s1obj | Handle to a Simulink API object |
| sfID | Stateflow ID |
| sfObj | Handle to a Stateflow API object from a singly instantiated Stateflow chart |
| {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] | Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |

ignore_descendants

Specifies to ignore the coverage of descendant objects if `ignore_descendants` is set to 1.

Output Arguments

coverage

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

| | |
|-------------------------------|---|
| <code>covered_outcomes</code> | Number of decision outcomes satisfied for <code>object</code> |
| <code>total_outcomes</code> | Number of decision outcomes for <code>object</code> |

description

`description` is a structure array containing the following fields:

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

Examples

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

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

Alternatives

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

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

More About

- “Decision Coverage (DC)”

See Also

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

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, 'slvndemo_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, 'slvndemo_cv_small_controller');
```

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`.

| | |
|------------------------|-------------------------------|
| <code>BlockPath</code> | Full path to a model or block |
|------------------------|-------------------------------|

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

Default:

metric

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

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

ignore_descendants

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

Output Arguments

coverage

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

| | |
|-------------------------|--|
| <i>covered_outcomes</i> | Number of test objectives satisfied for object |
| <i>total_outcomes</i> | 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 dialog box to collect and display coverage results for Simulink Design Verifier library blocks:

- 1 Open the model.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** tab, select **Coverage for this model**.
- 4 Under **Coverage metrics**, select **Simulink Design Verifier**.
- 5 Click **OK** to close the Coverage Settings dialog box and save your changes.
- 6 Simulate the model and review the results.

More About

- “Simulink Design Verifier Coverage”

See Also

complexityinfo | cvsim | conditioninfo | decisioninfo | mdcinfo |
overflowsaturationinfo | sigrangeinfo | sigsizeinfo | tableinfo

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

| | |
|---------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>row</code> | An integer specifying the row |
| <code>column</code> | An integer specifying the column |

Output Arguments

| | |
|----------------------|---|
| <code>content</code> | 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

- “Authoring 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 string that identifies the check.

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

See Also

“Model Advisor Customization”

How To

- “Define Custom Checks”
- “Authoring Checks”

mcdcinfo

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

Syntax

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

Description

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

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

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

Input Arguments

cvdo

`cvdata` object

ignore_descendants

Logical value specifying whether to ignore the coverage of descendant objects

1 — Ignore coverage of descendant objects

0 — Collect coverage for descendant objects

object

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

| Object Specification | Description |
|----------------------|--|
| BlockPath | Full path to a model or block |
| BlockHandle | Handle to a model or block |
| s1obj | Handle to a Simulink API object |
| sfID | Stateflow ID |
| sfObj | Handle to a Stateflow API object |
| {BlockPath, sfID} | Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |
| {BlockPath, sfObj} | Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart |
| [BlockHandle, sfID] | Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |

Output Arguments

coverage

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

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

description

A structure array containing the following fields:

| | |
|-------------|--|
| <i>text</i> | String denoting whether the condition/decision is associated with a block output or Stateflow transition |
|-------------|--|

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

Examples

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

```
mdl = 'slvndemo_cv_small_controller';
open_system(mdl)
%Create test specification object
testObj = cvtest(mdl)
%Enable MCDC coverage
testObj.settings.mcdc = 1;
%Simulate model
data = cvsim(testObj)
%Retrieve MCDC results for Logic block
blk_handle = get_param([mdl, '/Gain/Logic'], 'Handle');
cov = mcdcinfo(data, blk_handle)
%Percentage of MCDC outcomes covered
percent_cov = 100 * cov(1) / cov(2)
```

Alternatives

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

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

- 5 On the **Results** and **Reporting** tabs, specify the output you need.
- 6 Click **OK** to close the Coverage Settings dialog box and save your changes.
- 7 Simulate the model and review the MCDC coverage results.

More About

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

See Also

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

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

- “Authoring 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

- “Authoring 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

- “Authoring 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

- “Authoring 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

- “Authoring 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

- “Authoring 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

| | |
|-------------------------------------|--|
| <code>setRefLink</code> | Add See Also section and links |
| <code>setSubBar</code> | Add line between subcheck results |
| <code>setSubResultStatus</code> | Add status to check or subcheck result |
| <code>setSubResultStatusText</code> | Add text below status in result |
| <code>setSubTitle</code> | Add title for subcheck in result |
| <code>setTableInfo</code> | Add data to table |
| <code>setTableTitle</code> | Add title to table |

Copy Semantics

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

Examples

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

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

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

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

% Add information describing the overall check
```

```

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

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

% Add See Also section for references to standards
setRefLink(ft1, {{'Standard 1 reference (setRefLink method)'},
    {'Standard 2 reference (setRefLink method)}});

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

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

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

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

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

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

% Last subcheck, suppress line

```

```
setSubBar(ft2, false);

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

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

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

Result:  Passed

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

Table of Blocks (setSubTitle method - Title of the subcheck)

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

See Also

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

Passed

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

Blocks in the Model (setTableTitle method)

| Index (setColTitles method) | Block Name (setColTitles method) |
|-----------------------------|--|
| 1 | format template test/Constant |
| 2 | format template test/Constant1 |
| 3 | format template test/Gain |
| 4 | format template test/Product |
| 5 | format template test/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)

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

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

Result:  Warning

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

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

See Also

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

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

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

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

See Also

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

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

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

Alternatives

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

See Also

“Model Advisor Customization”

How To

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

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 string identifying the format type of the template, either list or table. Valid values are `ListTemplate` and `TableTemplate`.

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

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

Examples

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

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

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

- “Format Model Advisor Results”

ModelAdvisor.Group 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

- “Authoring 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

- “Authoring 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

- “Authoring Checks”

- “Format Model Advisor 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

- “Authoring Checks”
- “Format Model Advisor 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

- “Authoring 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, `slvndemo_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

- “Authoring 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

- “Authoring Checks”
- “Format Model Advisor 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

- “Authoring Checks”
- “Format Model Advisor 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

- “Authoring Checks”

- “Format Model Advisor 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

- “Authoring Checks”
- “Format Model Advisor 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, `slvnnvdemo_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

- “Authoring 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”
- “Authoring 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 `D0178B:OptionSet`:

```
NewID = ModelAdvisor.lookupCheckID('D0178B:OptionSet');
```

Alternatives

“Archive and View Results”

More About

- “Archive and View Results”

See Also

`ModelAdvisor.run`

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

- “Authoring Checks”
- “Format Model Advisor 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

- “Authoring 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: ' ' (null string)

Name

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

Default: ' ' (null string)

ID

Specifies a permanent, unique identifier for the procedure.

Note:

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

MAObj

Specifies a handle to the current Model Advisor object.

Methods

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

Copy Semantics

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

See Also

“Model Advisor Customization”

How To

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

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

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

- “Authoring 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

- “Authoring 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 “Finding Check IDs”.

`CheckIDList` optionally can include input parameters for specific checks using the following syntax; `{'CheckID','InputParam',{'IP','IPV'}}`, where `IP` is the input parameter

name and IPV is the corresponding input parameter value. You can specify several input parameter name and value pair arguments in any order as IP1 ,IPV1 ,..., IPN, IPVN.

FileName

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

Name-Value Pair Arguments

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

'DisplayResults'

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

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

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

Default: 'Summary'

'Force'

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. 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 “Understanding the Save and Load Process”).

CheckResultObj

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

Examples

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

```
% Create list of checks and models to run.
```

```
CheckIDList ={'mathworks.maab.jc_0021',...
    'mathworks.iec61508.RootLevelImports'};
SysList={'sldemo_auto_climatecontrol/Heater Control',...
    'sldemo_auto_climatecontrol/AC Control'};

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

Runs the Model Advisor configuration file `slvndemo_mdldv_config.mat` on the `sldemo_auto_climatecontrol/Heater Control` and `sldemo_auto_climatecontrol/AC Control` subsystems:

```
% Identify Model Advisor configuration file.
% Create list of models to run.
fileName = 'slvndemo_mdldv_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.
- “Automating Check Execution”
- “Finding Check IDs”
- “Organize Checks and Folders Using the Model Advisor Configuration Editor”
- “Understanding the Save and Load Process”

See Also

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

Tutorials

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

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 = 'slvndemo_mdldv_config.mat';  
SysList={'sldemo_auto_climatecontrol/Heater Control',...  
        'sldemo_auto_climatecontrol/AC Control'};  
  
% Run the Model Advisor.  
SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',fileName);  
  
% Open the Model Advisor Command-Line Summary report.  
ModelAdvisor.summaryReport(SysResultObjArray)
```

Alternatives

“View Results in Model Advisor Command-Line Summary Report”

More About

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

See Also

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

Tutorials

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

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

| | |
|----------------------------------|--|
| <code>setEntryAlign</code> | Specify table cell alignment |
| <code>setEntryValign</code> | Specify table cell vertical alignment |
| <code>setHeading</code> | Specify table title |
| <code>setHeadingAlign</code> | Specify table title alignment |
| <code>setRowHeading</code> | Specify table row title |
| <code>setRowHeadingAlign</code> | Specify table row title alignment |
| <code>setRowHeadingValign</code> | Specify table row title vertical alignment |

Copy Semantics

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

See Also

“Model Advisor Customization”

How To

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

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

- “Authoring 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

- “Authoring 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

- “Authoring Checks”
- “Format Model Advisor 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

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

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

overflowsaturationinfo

Retrieve saturation on integer overflow coverage from cvdata object

Syntax

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

Description

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

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

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

Examples

Collect Saturation on Integer Overflow Coverage for MinMax Block

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

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

```
open_system('sldemo_fuelsys');
```

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

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

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

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

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

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

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

```
covResults =
```

```
    1    2
```

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

Collect Saturation on Integer Overflow Coverage and Description for Example Model

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

Open the `slvndemo_saturation_on_overflow_coverage` example model.

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

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

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

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

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

```

    'Controller/Sum')
covResults =
    1     2

covDesc =
    isFiltered: 0
    decision: [1x1 struct]

```

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

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

```

covDesc.decision.outcome(1)
ans =
    executionCount: 3
           text: 'false'

covDesc.decision.outcome(2)
ans =
    executionCount: 0
           text: 'true'

```

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

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

- “Command Line Verification Tutorial”

Input Arguments

covdata — Coverage results data

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

Example: `'slvndemo_saturation_on_overflow_coverage'`

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

ignore_descendants — Preference to ignore coverage of descendant objects

0 (default) | 1

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

1 — Ignore coverage of descendant objects

0 — Collect coverage for descendant objects

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:

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

Data Types: `double`

description — Textual description of coverage outcomes

structure array

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

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

| | | |
|---------------------------------------|------|--|
| | text | 'true' or 'false' |
| <code>decision.isFiltered</code> | | Saturation on integer overflow has two possible outcomes, 'true' and 'false'. 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”. |
| <code>decision.filterRationale</code> | | 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`

relationalboundaryinfo

Retrieve relational boundary coverage from `cvdata` object

Syntax

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

Description

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

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

`[coverage, description] = relationalboundaryinfo(cvdata, object)` returns relational boundary coverage results from the `cvdata` object `cvdata` 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 `slvndemo_cv_small_controller` model. Create a model coverage test specification object for the model.

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

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

```
testObj.settings.relatiop = 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 `slvndemo_cv_small_controller`. The coverage results are stored in a two-element vector of the form `[covered_outcomes total_outcomes]`.

```
blockHandle = get_param('slvndemo_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

covdata object

Coverage results data, specified as a covdata object.

object — Model or model component

full path | handle

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

| Object Specification | Description |
|----------------------|--|
| BlockPath | Full path to a model or block |
| BlockHandle | Handle to a model or block |
| s1obj | Handle to a Simulink API object |
| sfID | Stateflow ID |
| sfObj | Handle to a Stateflow API object |
| {BlockPath, sfID} | Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |
| {BlockPath, sfObj} | Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart |

| Object Specification | Description |
|----------------------|---|
| [BlockHandle, sfID] | Array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |

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

ignore_descendants — Preference to ignore coverage of descendant objects

0 (default) | 1

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

1 — Ignore coverage of descendant objects

0 — Collect coverage for descendant objects

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:

| | |
|-------------------------------|---|
| <code>covered_outcomes</code> | Number of relational boundary outcomes satisfied for object |
| <code>total_outcomes</code> | 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:

| | | | | | | | |
|-------------------------------|--|-----------------------|--|------------------------|---|-------------------|--|
| <code>isFiltered</code> | 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”. | | | | | | |
| <code>decision.text</code> | String of the form: <i>op_1 - op_2</i> <ul style="list-style-type: none"> • <i>op_1</i> is the left operand in the relational operation. • <i>op_2</i> is the right operand in the relational operation. | | | | | | |
| <code>decision.outcome</code> | Structure array containing two fields for each coverage outcome: <table> <tr> <td><code>isActive</code></td> <td>Boolean variable. If this variable is <code>false</code>, it indicates that decisions were not evaluated during simulation due to variable signal size.</td> </tr> <tr> <td><code>execCount</code></td> <td>Number of times <i>op_1 - op_2</i> fell in the range described by <code>text</code></td> </tr> <tr> <td><code>text</code></td> <td>The range around the relational boundary considered for coverage. For more information, see “Relational Boundary”.</td> </tr> </table> | <code>isActive</code> | Boolean variable. If this variable is <code>false</code> , it indicates that decisions were not evaluated during simulation due to variable signal size. | <code>execCount</code> | Number of times <i>op_1 - op_2</i> fell in the range described by <code>text</code> | <code>text</code> | The range around the relational boundary considered for coverage. For more information, see “Relational Boundary”. |
| <code>isActive</code> | Boolean variable. If this variable is <code>false</code> , it indicates that decisions were not evaluated during simulation due to variable signal size. | | | | | | |
| <code>execCount</code> | Number of times <i>op_1 - op_2</i> fell in the range described by <code>text</code> | | | | | | |
| <code>text</code> | 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`

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

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

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

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

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

Examples

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

How To

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

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('gidget', object)

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

rmi setup
rmi register linktypename
rmi unregister linktypename
rmi linktypelist

number_problems = rmi('checkdoc')
number_problems = rmi('checkdoc', docName)
```

```
rmi('check', matlabfilepath)

rmi('doorssync', model)

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

Description

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

`number_problems = rmi('checkdoc')` checks validity of links to Simulink from a requirements document in Microsoft® Word, Microsoft Excel®, or IBM Rational DOORS. It prompts for the requirements document name, returns the total number of problems detected, and opens an HTML report in the MATLAB Web browser. For more information, see “Validate Requirements Links in a Requirements Document”.

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

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

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

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

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

`label = rmi('doorsLabel', moduleID, objectID)` generates a label for the requirements link to the IBM Rational DOORS object specified by `objectID` in the DOORS module specified by `moduleID`, according to the current template.

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

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>]');
```

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 string or handle.

Example: 'slvnvdemo_officereq'

Data Types: char

object — Model object with which requirements can be associated

name | handle

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

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

Data Types: char

sig_builder — Signal Builder block containing signal group with requirements traceability associations

name | handle

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

Data Types: char

group_idx — Signal Builder group index

integer

Signal Builder group index, specified as a scalar.

Example: 2

Data Types: char

matlabfilepath — MATLAB code file with requirements traceability associations

path

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

Example:

Data Types: char

guidStr — Globally unique identifier for model object

string

Globally unique identifier for model object object, specified as a string.

Example: GIDa_59e165f5_19fe_41f7_abc1_39c010e46167

Data Types: char

index — Index number of requirement linked to model object

integer

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

docName — Requirements document in external application

file name | path

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

- IBM Rational DOORS module ID.

- path to Microsoft Word requirements document.
- path to Microsoft Excel requirements document.

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

label1 — Label for links to requirements in IBM Rational DOORS

string

Example:

Data Types: char

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

string

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

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

| | |
|-------------------|-----------------------------------|
| %h | Object heading |
| %t | Object text |
| %p | Module prefix |
| %n | Object absolute number |
| %m | Module ID |
| %P | Project name |
| %M | Module name |
| %U | DOORS URL |
| %<ATTRIBUTE_NAME> | Other DOORS attribute you specify |

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

Data Types: char

moduleID — IBM Rational DOORS module

DOORS module ID

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

Example:

Data Types: char

objectID — IBM Rational DOORS object
DOORS object ID

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

Example:

Data Types: char

Output Arguments

reqlinks — Requirement links data
struct

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

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

| 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 | String describing the requirement |
| keywords | Optional string supplementing description |
| reqsys | String identifying the link type registration name; 'other' for built-in link types |

cmdStr — Command string used to navigate to model object

string

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

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

titleStr — Textual description of model object with requirements links

string

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

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

guidStr — Globally unique identifier for model object

string

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

Example: `GIDa_59e165f5_19fe_41f7_abc1_39c010e46167`

dialog — Requirements dialog box for model object

handle

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

number_problems — Total count of invalid links detected in external document

integer

Total count of invalid links detected in external document docName.

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

totalModifiedLinks — Total count of DOORS requirements links updated with new label template

integer

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

More About

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

See Also

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

rmidata.default

Specify default storage location of requirements traceability data for new models

Syntax

```
rmidata.default(storage_setting)
```

Description

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

Input Arguments

storage_setting

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

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

Examples

Specify to store requirements traceability data in the model file:

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

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

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

Alternatives

To set the storage location from the Simulink Editor:

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

More About

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

See Also

`rmi` | `rמידata.export` | `rמידata.map` | `rמידata.save`

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:

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

More About

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

See Also

`rמידata.save` | `rמידata.default` | `rמידata.map`

rmidata.map

Associate externally stored requirements traceability data with model

Syntax

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

Description

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

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

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

Input Arguments

model

Name, handle, or full path for a Simulink model

reqts_file

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

Alternatives

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

- 1 Open the model.

2 Select **Analysis > Requirements > Load Links**.

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

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

4 Click **OK**.

Examples

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

```
open_system('slvndemo_powerwindowController');
reqFile = fullfile(matlabroot, 'toolbox', 'slvnv', ...
    'rmidemos', 'powerwin_reqs', ...
    'slvndemo_powerwindowRequirements.req');
rmidata.map('slvndemo_powerwindowController', reqFile);
rmi('highlightModel', 'slvndemo_powerwindowController');
```

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

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

More About

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

See Also

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

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, `slvndemo_powerwindowController`.

```
open_system('slvndemo_powerwindowController');
```

Specify that the model store requirements data externally.

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

Create a new requirements link structure.

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

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

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

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

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

Specify that the new requirements link that you created be attached to the Mux4 block of the `slvnm_demo_powerwindowController` example model.

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

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

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

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

To highlight the Mux4 block, turn on requirements highlighting for the `slvnm_demo_powerwindowController` example model.

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

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

Close the example model.

```
close_system('slvnm_demo_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

string | handle

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

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 `rmidata.default` 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.default` | `rmidata.export` | `rmidata.map`

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 string that contains the existing full or partial file or path name. `new_path` is a string with the new full or partial file or path name.

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

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

Examples

For the current Simulink model, update all links to requirements files that contain the string 'project_0220', replacing them with 'project_0221':

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

Alternatives

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

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

See Also

rmi

rmi.doorssync

Synchronize model with DOORS surrogate module

Syntax

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

Description

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

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

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

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

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

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

Input Arguments

model_name

Name or handle of a Simulink model

settings

Structure with the following fields.

| Field | Description |
|---------------|---|
| surrogatePath | Path to a DOORS project in the form ' / 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 |
| s1ToDoors | Copies links from Simulink to the surrogate module. Default: 0 |
| doorsToS1 | Copies links from the surrogate module to Simulink. If both doorsToS1 and s1ToDoors are set to 1, an error occurs. Default: 0 |
| purgeSimulink | Removes unmatched links in Simulink (ignored if doorsToS1 is set to 0). rmi.doorssync ignores purgeSimulink if doorsToS1 is set to 0. Default: 0 |

| Field | Description |
|-------------|---|
| purgeDoors | Removes unmatched links in the surrogate module (ignored if <code>slToDoors</code> 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 `slvndemo_fuelsys_officereq` model, specify to copy the links from the model to DOORS, and synchronize the model to create the surrogate module:

```
slvndemo_fuelsys_officereq;
settings = rmi.doorssync('slvndemo_fuelsys_officereq', ...
```

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

Alternatives

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

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

More About

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

See Also

rmi

rmi.objinfo

Return navigation information for model object

Syntax

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

Description

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

Input Arguments

obj

Name or handle of a Simulink or Stateflow object.

Default:

Output Arguments

navCmd

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

dispString

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

Examples

Open the `slvnvdemo_fuelsys_officereq` example model, get the unique identifier for the MAP Sensor block, and navigate to that block using the `rmiobjnavigate` function:

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

See Also

rmi | rmiobjnavigate

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 string 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 `slvndemo_fuelsys_officereq` example model, get the unique identifier for the MAP Sensor block:


```

slvndemo_fuelsys_officereq;           % Open example model
gcb = ...
    'slvndemo_fuelsys_officereq/MAP sensor'; % Make current block
navCmdString = rmi.objinfo(gcb)       % Get rmiobjnavigate command
                                         % with model name and object ID

```

`rmi.objinfo` returns the following value for `navCmdString`:

```

navCmdString =
rmiobjnavigate('slvndemo_fuelsys_officereq.mdl', ...
    'GIDa_9fc2c968_6068_49c6_968d_b08e363248b9');

```

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

```

eval(navCmdString);                   % Execute rmiobjnavigate command

```

More About

- “Use the `rmiobjnavigate` Function”

See Also

`rmi` | `rmi.objinfo`

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 string, the default value of the 'SelectionLinkTag' preference.

```
previousVal =
''
```

View the currently specified value for the 'SelectionLinkTag' preference.

```
currentVal = rmipref('SelectionLinkTag')
```

The function returns the currently specified comma-separated list of user tags.

```
currentVal =
design,reqts
```

These user tags apply to all new selection-based requirements links that you create.

External Storage of Requirements Traceability Data

Configure the RMI to store requirements links data in a separate `.req` file, instead of embedded in the model file.

Note: If you have existing requirements links for your model that are stored internally, you need to move these links into an external `.req` file before you change the storage settings for your requirements traceability data. See “Move Internally Stored Requirements Links to External Storage” for more information.

If you would like to store requirements traceability data in a separate `.req` file, set the `'StoreDataExternally'` preference to 1.

```
previousVal = rmipref('StoreDataExternally',1)
```

When you specify a new value for an RMI preference, `rmipref` returns the previous value of that RMI preference. By default, the RMI stores requirements links data internally with the model, so the previous value of this preference was 0.

```
previousVal =  
    0
```

After you set the `'StoreDataExternally'` preference to 1, your requirements links are stored externally, in a separate `.req` file.

```
currentVal = rmipref('StoreDataExternally')  
  
currentVal =  
    1
```

Input Arguments

prefName — RMI preference name

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

RMI preference name, specified as the corresponding **Name** string listed in “Name-Value Pair Arguments” on page 1-188.

Name-Value Pair Arguments

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

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

'BiDirectionalLinking' — Bi-directional selection linking preference

`false` (default) | `true`

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

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

Data Types: `logical`

'DocumentPathReference' — Preference for path format of links to requirements documents from model

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

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

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

For more information, see “Document Path Storage”.

Data Types: `char`

'ModelPathReference' — Preference for path format in links to model from requirements documents

`'none'` (default) | `'absolute'`

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

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

Data Types: char

'LinkIconFilePath' — Preference to use custom image file as requirements link icon
empty string (default) | full image file path

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

Data Types: char

'FilterEnable' — Preference to enable filtering by user tag keywords
false (default) | true

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

Data Types: logical

'FilterRequireTags' — Preference for user tag keywords for requirements links
empty string (default) | comma-separated list of user tag keywords

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

Data Types: char

'FilterExcludeTags' — Preference to exclude certain requirements links from model highlighting and reports
empty string (default) | comma-separated list of user tag keywords

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

Data Types: char

'FilterMenusByTags' — Preference to disable labels of requirements links with designated user tags

false (default) | true

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

Data Types: logical

'FilterConsistencyChecking' — Preference to filter Model Advisor requirements consistency checks with designated user tags

false (default) | true

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

Data Types: logical

'KeepSurrogateLinks' — Preference to keep DOORS surrogate links when deleting all requirements links

empty (default) | false | true

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

Data Types: logical

'ReportFollowLibraryLinks' — Preference to include requirements links in referenced libraries in generated report

false (default) | true

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

Data Types: logical

'ReportHighlightSnapshots' — Preference to include highlighting in model snapshots in generated report

true (default) | false

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

Data Types: logical

'ReportNoLinkItems' — Preference to include model objects with no requirements links in generated requirements reports

false (default) | true

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

Data Types: logical

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

false (default) | true

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

Data Types: logical

'ReportIncludeTags' — Preference to list user tags for requirements links in generated reports

false (default) | true

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

Data Types: `logical`

'ReportDocDetails' — Preference to include extra detail from requirements documents in generated reports

`false` (default) | `true`

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

Data Types: `logical`

'ReportLinkToObjects' — Preference to include links to model objects in generated requirements reports

`false` (default) | `true`

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

Data Types: `logical`

'SelectionLinkWord' — Preference to include Microsoft Word selection link option in Requirements context menu

`true` (default) | `false`

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

Data Types: `logical`

'SelectionLinkExcel' — Preference to include Microsoft Excel selection link option in Requirements context menu

`true` (default) | `false`

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

Data Types: logical

'SelectionLinkDoors' — Preference to include IBM Rational DOORS selection link option in Requirements context menu

true (default) | false

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

Data Types: logical

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

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

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

Data Types: char

'StoreDataExternally' — Preference to store requirements links data in external .req file

false (default) | true

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

Data Types: logical

'UseActiveXButtons' — Preference to use legacy ActiveX® buttons in Microsoft Office requirements documents

false (default) | true

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

Data Types: `logical`

'CustomSettings' — Preference for storing custom settings

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

Preference for storing custom settings, specified as a structure array. Each field of the structure array corresponds to the name of your custom preference, and each associated value corresponds to the value of that custom preference.

Data Types: `struct`

Output Arguments

currentVal — Current value of the RMI preference specified by `prefName`

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

Current value of the RMI preference specified by `prefName`. RMI preference names and their associated possible values are listed in “Name-Value Pair Arguments” on page 1-188.

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 1-188.

More About

- “Requirements Settings”

See Also

`rmi`

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 string that indicates the requirements document type:

- 'word'
- 'excel'

Examples

Remove the links in an example requirements document, and then reinsert them:

- 1 Open the example model:

```
slvndemo_fuelsys_officereq
```

- 2 Open the example requirements document:

```
open([matlabroot strcat('/toolbox/slvnv/rmidemos/fuelsys_req_docs/',...  
    'slvndemo_FuelSys_DesignDescription.docx')])
```

- 3 Remove the links from the requirements document:

```
rmiref.removeRefs('word')
```

- 4 Enter y to confirm the removal.

- 5 Reinsert the links from the requirements document to the model:

```
[total_links, total_matches, total_inserted] = ...  
    rmiref.insertRefs(gcs, 'word')
```

See Also

rmiref.removeRefs

rmiref.removeRefs

Remove links to models from requirements documents

Syntax

```
rmiref.removeRefs(doc_type)
```

Description

`rmiref.removeRefs(doc_type)` removes all links to models from the open, active requirements document of type `doc_type`.

Input Arguments

doc_type

A string that indicates the requirements document type:

- 'word'
- 'excel'
- 'doors'

Examples

Remove the links in this example requirements document:

```
open([matlabroot strcat('/toolbox/slvnv/rmidemos/fuelsys_req_docs/', ...  
    'slvnvdemo_FuelSys_DesignDescription.docx')])  
rmiref.removeRefs('word')
```

See Also

`rmiref.insertRefs`

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 a string tag as a user tag for all requirements links in model.

`rmitag(model, 'add', tag, doc_pattern)` adds tag as a user tag for all links in model, where the full or partial document name matches the regular expression `doc_pattern`.

`rmitag(model, 'delete', tag)` removes the user tag, tag from all requirements links in model.

`rmitag(model, 'delete', tag, doc_pattern)` removes the user tag, tag, from all requirements links in model, where the full or partial document name matches `doc_pattern`.

`rmitag(model, 'replace', tag, new_tag)` replaces tag with new_tag for all requirements links in model.

`rmitag(model, 'replace', tag, new_tag, doc_pattern)` replaces `tag` with `new_tag` for links in `model`, where the full or partial document name matches the regular expression `doc_pattern`.

`rmitag(model, 'clear', tag)` deletes all requirements links that have the user tag, `tag`.

`rmitag(model, 'clear', tag, doc_pattern)` deletes all requirements links that have the user tag, `tag`, and link to the full or partial document name specified in `doc_pattern`.

Input Arguments

model

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

tag

String specifying user tag for requirements links.

doc_pattern

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

new_tag

String that indicates the name of a user tag for a requirements link. Use this argument when replacing an existing user tag with a new user tag.

Examples

Open the `slvndemo_fuelsys_officereq` example model, and add the user tag `tmptag` to all objects with requirements links:

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


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

```
open_system('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`

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

String that specifies the desired action for what content to include from a DOORS record in the generated requirements report. Valid values for this argument are as follows.

| Value | Description |
|-----------|---|
| 'default' | Restore the default settings for the DOORS system attributes to include in the report. The default configuration includes the Object Heading and Object Text attributes, and all other attributes, except: <ul style="list-style-type: none">• 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. |
| 'type' | Include or omit groups of DOORS attributes from the report. |

| Value | Description |
|------------|---|
| | <p>If you specify 'type' for the first argument, valid values for the second argument are:</p> <ul style="list-style-type: none"> • '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' | <p>Enable or disable the empty attribute filter:</p> <ul style="list-style-type: none"> • Enter <code>RptgenRMI.doorsAttribs('nonempty', 'off')</code> to omit all empty attributes from the report. • Enter <code>RptgenRMI.doorsAttribs('nonempty', 'on')</code> to include empty user-defined attributes. The report never includes empty system attributes. |

Default:**attribute**

String 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 strings that indicate which DOORS attributes to include in the requirements report, for example:

```
>> RptgenRMI.doorsAttribs('show')
```

```
ans =
```

```
'Object Heading'  
'Object Text'  
'$AllAttributes$'  
'$NonEmpty$'  
'-Created Thru'
```

- The **Object Heading** and **Object Text** attributes are included by default.
- '\$AllAttributes\$' specifies to include all attributes associated with each DOORS object.
- '\$Nonempty\$' specifies to exclude all empty attributes.
- '-Created Thru' specifies to exclude the **Created Thru** attribute for each DOORS object.

Examples

Limit the DOORS attributes in the requirements report to user-defined attributes:

```
RptgenRMI.doorsAttribs('type', 'user');
```

Omit the content of the **Last Modified By** attribute from the requirements report:

```
RptgenRMI.doorsAttribs('remove', 'Last Modified By');
```

Include the content of the **Last Modified On** attribute in the requirements report, even if system attributes are not included as a group:

```
RptgenRMI.doorsAttribs('add', 'Last Modified On');
```

Include empty system attributes in the requirements report:

```
RptgenRMI.doorsAttribs('nonempty', 'off');
```

Omit the **Object Heading** attribute from the requirements report. Use this option when the link label is always the same as the **Object Heading** for the target DOORS object and you do not want duplicate information in the requirements report:

```
RptgenRMI.doorsAttribs('remove', 'Object Heading');
```

See Also

rmi

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

- “Authoring 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

- “Authoring Checks”

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

| | |
|-------------------|---|
| <code>text</code> | Instantiation of the ModelAdvisor.Text class |
| <code>mode</code> | A Boolean value indicating bold formatting of text: <ul style="list-style-type: none">• <code>true</code> — Format the text in bold font.• <code>false</code> — 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

- “Authoring 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, `slvndemo_mdadv`. The example does not execute as shown without the additional content found in the `sl_customization.m` file.

```
rec = ModelAdvisor.Check('mathworks.example.optimizationSettings');
% Define an automatic fix action for this check
modifyAction = ModelAdvisor.Action;
modifyAction.setCallbackFcn(@modifyOptimizationSetting);
modifyAction.Name = 'Modify Settings';
modifyAction.Description = ['Modify model configuration optimization' ...
    ' settings that can impact safety'];
modifyAction.Enable = true;
rec.setAction(modifyAction);
```

See Also

“Model Advisor Customization”

How To

- “Define Check Actions”

- “Authoring Checks”
- “setActionEnable”

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

| | |
|------------------------|--|
| <code>check_obj</code> | Instantiation of the <code>ModelAdvisor.Check</code> class |
| <code>handle</code> | Handle to a check callback function |
| <code>context</code> | Context for checking the model or subsystem: <ul style="list-style-type: none">• 'None' — No special requirements.• 'PostCompile' — The model must be compiled. |
| <code>style</code> | Type of callback function: <ul style="list-style-type: none">• '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”
- “Authoring 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

| | |
|-----------------------|--|
| <code>task</code> | Instantiation of the <code>ModelAdvisor.Task</code> class |
| <code>check_ID</code> | A unique string that identifies the check to use in the task |

Examples

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

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 string 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

- “Authoring Checks”
- “Format Model Advisor 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

| | |
|----------------------|---|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>column</code> | An integer specifying the column number |
| <code>heading</code> | A string, element object, or object array specifying the table column title |

Examples

```
table1 = ModelAdvisor.Table(2, 3);  
setColHeading(table1, 1, 'Header 1');  
setColHeading(table1, 2, 'Header 2');  
setColHeading(table1, 3, 'Header 3');
```

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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

| | |
|-------------------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>column</code> | An integer specifying the column number |
| <code><i>alignment</i></code> | Alignment of the column heading. <i>alignment</i> can have one of the following values: <ul style="list-style-type: none">• <code>left</code> (default)• <code>right</code>• <code>center</code> |

Examples

```
table1 = ModelAdvisor.Table(2, 3);  
setColHeading(table1, 1, 'Header 1');  
setColHeadingAlign(table1, 1, 'center');  
setColHeading(table1, 2, 'Header 2');  
setColHeadingAlign(table1, 2, 'center');
```

```
setColHeading(table1, 3, 'Header 3');  
setColHeadingAlign(table1, 3, 'center');
```

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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

| | |
|-------------------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>column</code> | An integer specifying the column number |
| <code><i>alignment</i></code> | Vertical alignment of the column heading. <i>alignment</i> can have one of the following values: <ul style="list-style-type: none">• 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

- “Authoring 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

| | |
|--------------------|---|
| <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class |
| <code>color</code> | An enumerated string specifying the color of the text. Possible formatting options include: <ul style="list-style-type: none">• <code>normal</code> (default) — Text is default color.• <code>pass</code> — Text is green.• <code>warn</code> — Text is yellow.• <code>fail</code> — Text is red.• <code>keyword</code> — 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

| | |
|--------------------------|---|
| <code>input_param</code> | Instantiation of the <code>ModelAdvisor.InputParameter</code> class |
| <code>start_col</code> | A positive integer representing the first column that the input parameter occupies in the layout grid |
| <code>end_col</code> | A positive integer representing the last column that the input parameter occupies in the layout grid |

Examples

```
inputParam2 = ModelAdvisor.InputParameter;  
inputParam2.Name = 'Standard font size';  
inputParam2.Value='12';  
inputParam2.Type='String';  
inputParam2.Description='sample tooltip';  
inputParam2.setRowSpan([2 2]);
```

```
inputParam2.setColSpan([1 1]);
```

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 strings or handles to formatting objects, specifying the column titles.

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

The order of the `col_title_N` inputs determines which column the title is in. If you do not add data to the table, the Model Advisor does not display the table in the result.

Examples

Create a table object, `ft`, and specify two column titles:

```
ft = ModelAdvisor.FormatTemplate('TableTemplate');  
setColTitles(ft, {'Index', 'Block Name'});
```

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”
- “Format Model Advisor 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

| | |
|---------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>column</code> | An integer specifying column number |
| <code>width</code> | An integer or array of integers specifying the column widths, relative to the entire table width |

Examples

```
table1 = ModelAdvisor.Table(2, 3)
```

```
setColWidth(table1, 1, 1);  
setColWidth(table1, 3, 2);
```

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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 string or an instance of ModelAdvisor.Element. The size of the cell array must be equal to the size of the table specified in the ModelAdvisor.Table constructor. |
|---------|---|

Examples

```
table = ModelAdvisor.Table(4,3);  
contents = cell(4,3); % 4 by 3 table  
for k=1:4  
    for m=1:3  
        contents{k,m} = ['Contents for row-' num2str(k) ' column-' num2str(m)];  
    end  
end  
table.setEntries(contents);
```

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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 string to a cell in a table.

`setEntry(table, row, column, content)` adds an object specified by `content` to a cell in a table.

Input Arguments

| | |
|----------------------|---|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>row</code> | An integer specifying the row |
| <code>column</code> | An integer specifying the column |
| <code>string</code> | A string representing the contents of the entry |
| <code>content</code> | An element object or object array specifying the content of the table entries |

Examples

Create two tables and insert `table2` into the first cell of `table1`:

```
table1 = ModelAdvisor.Table(1, 1);
```

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

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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

| | |
|-------------------------------|---|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>row</code> | An integer specifying row number |
| <code>column</code> | An integer specifying column number |
| <code><i>alignment</i></code> | A string specifying the cell alignment. Possible values are: <ul style="list-style-type: none">• <code>left</code> (default)• <code>right</code>• <code>center</code> |

Examples

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



```
.  
setEntry(table1, 1, 1, 'First Entry');  
setEntryAlign(table1, 1, 1, 'center');
```

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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

| | |
|-------------------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>row</code> | An integer specifying row number |
| <code>column</code> | An integer specifying column number |
| <code><i>alignment</i></code> | A string specifying the cell vertical alignment. Possible values are: <ul style="list-style-type: none">• <code>top</code> (default)• <code>middle</code>• <code>bottom</code> |

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

- “Authoring Checks”

setHeading

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify table title

Syntax

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

Description

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

Input Arguments

| | |
|--------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>title</code> | A string, element object, or object array that specifies the table title |

Examples

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

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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

| | |
|-------------------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code><i>alignment</i></code> | A string specifying the table title alignment. Possible values are: <ul style="list-style-type: none">• <code>left</code> (default)• <code>right</code>• <code>center</code> |

Examples

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

See Also

“Model Advisor Customization”

How To

- “Authoring 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

| | |
|--------------------|--|
| <code>image</code> | Instantiation of the <code>ModelAdvisor.Image</code> class |
| <code>url</code> | A string specifying the target URL |

Examples

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

See Also

“Model Advisor Customization”

How To

- “Authoring 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

| | |
|-------------------|---|
| <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class |
| <code>url</code> | A string that specifies the target location of the URL |

Examples

```
t1 = ModelAdvisor.Text('MathWorks home page');  
setHyperlink(t1, 'http://www.mathworks.com');
```

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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

| | |
|------------------------|--|
| <code>image_obj</code> | Instantiation of the <code>ModelAdvisor.Image</code> class |
| <code>source</code> | A string specifying the location of the image file |

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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 string 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

- “Authoring Checks”
- “Format Model Advisor 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

| | |
|------------------------|---|
| <code>check_obj</code> | Instantiation of the <code>ModelAdvisor.Check</code> class |
| <code>params</code> | A cell array of <code>ModelAdvisor.InputParameters</code> 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

- “Authoring 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

| | |
|------------------------|--|
| <code>check_obj</code> | Instantiation of the <code>ModelAdvisor.Check</code> class |
| <code>row</code> | Number of rows in the layout grid |
| <code>col</code> | Number of columns in the layout grid |

Examples

```
% --- sample check 1
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');
rec.Title = 'Check Simulink block font';
rec.TitleTips = 'Example style three callback';
rec.setCallbackFcn(@SampleStyleThreeCallback,'None','StyleThree');
rec.setInputParametersLayoutGrid([3 2]);
```

See Also

“Model Advisor Customization” | `ModelAdvisor.InputParameter`

How To

- “Authoring 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

| | |
|-------------------|---|
| <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class |
| <code>mode</code> | A Boolean value indicating italic formatting of text: <ul style="list-style-type: none">• <code>true</code> — Italicize the text.• <code>false</code> — Do not italicize the text. |

Examples

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

See Also

“Model Advisor Customization”

How To

- “Authoring 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

- “Authoring Checks”
- “Format Model Advisor 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 strings or handles to formatting objects, that describes the recommended action to fix the issues reported by the check.

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

The Model Advisor displays the recommended action as a separate section below the list or table in the report.

Examples

Create a list object, `ft`, find Gain blocks in the model, and recommend changing them:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
% Find all Gain blocks
gainBlocks = find_system(gcs, 'BlockType','Gain');

% Find Gain blocks
for idx = 1:length(gainBlocks)
    gainObj = get_param(gainBlocks(idx), 'Object');

    setRecAction(ft, {'If you are using these blocks '...
        'as buffers, you should replace them with '...
        'Signal Conversion blocks'});
end
```

See Also

“Model Advisor Customization”

How To

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

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

`setRefLink(ft_obj, {'url', 'standard'})` generates a list of links in the See Also section. *url* is a string that indicates the location to link to. You must provide the full link including the protocol. For example, `http:\\www.mathworks.com` is a valid link, while `www.mathworks.com` is not a valid link. You can create a link to a protocol that is valid URL, such as a web site address, a full path to a file, or a relative path to a file.

Note: `setRefLink` expects a cell array of cell arrays for the second input.

Examples

Create a list object, `ft`, and add a related standard:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
setRefLink(ft, {'IEC 61508-3, Table A.3 (3) 'Language subset'});
```

Create a list object, `ft`, and add a list of related standards:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
setRefLink(ft, {
    {'IEC 61508-3, Table A.3 (2) ''Strongly typed programming language''},...
    {'IEC 61508-3, Table A.3 (3) ''Language subset''}});
```

See Also

“Model Advisor Customization”

How To

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

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

| | |
|-------------------|---|
| <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class |
| <code>mode</code> | A Boolean value indicating whether to preserve spaces and carriage returns in the text: <ul style="list-style-type: none">• <code>true</code> (default) — Preserve spaces and carriage returns.• <code>false</code> — Do not preserve spaces and carriage returns. |

Examples

```
t1 = ModelAdvisor.Text('MathWorks home page');  
setRetainSpaceReturn(t1, 'true');
```

See Also

“Model Advisor Customization”

How To

- “Authoring 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

| | |
|----------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>row</code> | An integer specifying row number |
| <code>heading</code> | A string, element object, or object array specifying the table row title |

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

- “Authoring 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

| | |
|-------------------------------|---|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>row</code> | An integer specifying row number. |
| <code><i>alignment</i></code> | A string specifying the cell alignment. Possible values are: <ul style="list-style-type: none">• <code>left</code> (default)• <code>right</code>• <code>center</code> |

Examples

```
table1 = ModelAdvisor.Table(2, 3);  
setRowHeading(table1, 1, 'Row 1 Title');  
setRowHeadingAlign(table1, 1, 'center');  
setRowHeading(table1, 2, 'Row 2 Title');  
setRowHeadingAlign(table1, 2, 'center');
```

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

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

| | |
|------------------------|---|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>row</code> | An integer specifying row number. |
| <code>alignment</code> | A string specifying the cell vertical alignment. Possible values are: <ul style="list-style-type: none">• 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

- “Authoring 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

| | |
|--------------------------|--|
| <code>input_param</code> | The input parameter object |
| <code>start_row</code> | A positive integer representing the first row that the input parameter occupies in the layout grid |
| <code>end_row</code> | A positive integer representing the last row that the input parameter occupies in the layout grid |

Examples

```
inputParam2 = ModelAdvisor.InputParameter;  
inputParam2.Name = 'Standard font size';  
inputParam2.Value='12';  
inputParam2.Type='String';  
inputParam2.Description='sample tooltip';  
inputParam2.setRowSpan([2 2]);  
inputParam2.setColSpan([1 1]);
```

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

- “Authoring Checks”
- “Format Model Advisor 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 string identifying the status of the check. Valid strings are:

Pass

Warn

Fail

Examples

Create a list object, `ft`, and add a passing status:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
setSubResultStatus(ft, 'Pass');
```

See Also

“Model Advisor Customization”

How To

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

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 string 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');
```



```
setSubResultStatus(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 Model Advisor 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

| | |
|-------------|--|
| <i>text</i> | Instantiation of the ModelAdvisor.Text class |
| <i>mode</i> | A Boolean value indicating subscripted formatting of text: <ul style="list-style-type: none">• 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

- “Authoring 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

| | |
|-------------------|--|
| <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class |
| <code>mode</code> | A Boolean value indicating superscripted formatting of text: <ul style="list-style-type: none">• <code>true</code> — Make the text superscript.• <code>false</code> — Do not make the text superscript. |

Examples

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

See Also

“Model Advisor Customization”

How To

- “Authoring 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 string or a handle to a formatting object specifying the title of the subcheck.

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

Examples

Create a list object, `ft`, and add a subcheck title:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
setSubTitle(ft, ['Check for constructs in the model '...])
```

```
'that are not supported when generating code']);
```

See Also

“Model Advisor Customization”

How To

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

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 strings or objects specifying the information in the body of the table. The Model Advisor creates hyperlinks to objects. If you do not add data to the table, the Model Advisor does not display the table in the result.

Note: Before creating a table, you must specify column titles using the `setColTitle` method.

Examples

Create a table object, `ft`, add column titles, and add data to the table:

```
ft = ModelAdvisor.FormatTemplate('TableTemplate');  
setColTitle(ft, {'Index', 'Block Name'});  
setTableInfo(ft, {'1', 'Gain'});
```

See Also

“Model Advisor Customization”

How To

- “Authoring Checks”

- “Format Model Advisor Results”

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 string or a handle to a formatting object specifying the title of the table.

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

The title appears above the table. If you do not add data to the table, the Model Advisor does not display the table and title in the result.

Examples

Create a table object, `ft`, and add a table title:


```
ft = ModelAdvisor.FormatTemplate('TableTemplate');  
setTableTitle(ft, 'Table of fonts and styles used in model');
```

See Also

“Model Advisor Customization”

How To

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

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

| | |
|-----------------------|--|
| <code>list_obj</code> | Instantiation of the <code>ModelAdvisor.List</code> class |
| <code>listType</code> | Specifies the list type: <ul style="list-style-type: none">• 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

- “Authoring Checks”

setUnderlined

Class: ModelAdvisor.Text

Package: ModelAdvisor

Underline text

Syntax

```
setUnderlined(text, mode)
```

Description

`setUnderlined(text, mode)` indicates whether to underline `text`.

Input Arguments

| | |
|-------------------|---|
| <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class |
| <code>mode</code> | A Boolean value indicating underlined formatting of text: <ul style="list-style-type: none">• <code>true</code> — Underline the text.• <code>false</code> — Do not underline the text. |

Examples

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

See Also

“Model Advisor Customization”

How To

- “Authoring 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 |
|--------------------------|---------------------------------|
| <code>BlockPath</code> | Full path to a model or block |
| <code>BlockHandle</code> | Handle to a model or block |
| <code>s1obj</code> | Handle to a Simulink API object |
| <code>sfID</code> | Stateflow ID |

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

portID

Output port of the block object

Output Arguments

max

Maximum signal value output by the model component `object` within the `cvdata` object, `cvdo`. If `object` outputs a vector, `min` and `max` are also vectors.

min

Minimum signal value output by the model component `object` within the `cvdata` object, `cvdo`. If `object` outputs a vector, `min` and `max` are also vectors.

Alternatives

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

- 1 Open the model for which you want to collect signal range coverage.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** tab, select **Coverage for this model**.
- 4 Under **Coverage metrics**, select **Signal Range**.

- 5 On the **Results** and **Reporting** tabs, specify the output you need.
- 6 Click **OK** to close the Coverage Settings dialog box and save your changes.
- 7 Simulate the model and review the results.

Examples

Collect signal range data for the Product block in the `slvndemo_cv_small_controller` model:

```
mdl = 'slvndemo_cv_small_controller';
open_system(mdl)
%Create test spec object
testObj = cvtest(mdl)
%Enable signal range coverage
testObj.settings.sigrange = 1;
%Simulate the model
data = cvsim(testObj)
blk_handle = get_param([mdl, '/Product'], 'Handle');
%Get signal range data
[minVal, maxVal] = sigrangeinfo(data, blk_handle)
```

See Also

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

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 |
| s1obj | Handle to a Simulink API object |
| sfID | Stateflow ID |

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

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 dialog box to collect signal size coverage for a model:

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

See Also

complexityinfo | cvsim | conditioninfo | decisioninfo | mcdcinfo |
sigrangeinfo | tableinfo

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_mdhref_conversion` model and copy it into a new model:

```
open_system('sldemo_mdhref_conversion');  
newmodel = slvnvextract('sldemo_mdhref_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);
```

slvnharnessopts

Generate default options for slvnvmakeharness

Syntax

```
harnessopts = slvnharnessopts
```

Description

`harnessopts = slvnharnessopts` generates the default configuration for running `slvnvmakeharness`.

Output Arguments

harnessopts

A structure whose fields specify the default configuration for `slvnvmakeharness`. The `harnessopts` structure can have the following fields. Default values are used if not specified.

| Field | Description |
|------------------------------|--|
| <code>harnessFilePath</code> | Specifies the file path for creating the harness model. If an invalid path is specified, <code>slvnvmakeharness</code> does not save the harness model, but it creates and opens the harness model. If this option is not specified, <code>slvnvmakeharness</code> generates a new harness model and saves it in the MATLAB current folder. Default: '' |
| <code>modelRefHarness</code> | Generates the test harness model that includes model in a Model block. When <code>false</code> , the test harness model includes a copy of model. Default: true |

| Field | Description |
|--------------------------------|--|
| <code>usedSignalsOnly</code> | When <code>true</code> , 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: <code>false</code> |
| <code>systemTestHarness</code> | When <code>true</code> , generates a SystemTest™ harness. This option requires <code>dataFile</code> path in addition to <code>model</code> . Default: <code>false</code> |

Examples

Create a test harness for the `sldemo_md1ref_house` model using the default options:

```
open_system('sldemo_md1ref_house');
harnessOpts = slvnharnessopts;
[harnessfile] = slvnvmakeharness('sldemo_md1ref_house',...
    '', harnessOpts);
```

See Also

`slvnvmakeharness`

slvnlvlogssignals

Log test data for component or model during simulation

Syntax

```
data = slvnlvlogssignals(model_block)
data = slvnlvlogssignals(harness_model)
data = slvnlvlogssignals(harness_model, test_case_index)
```

Description

`data = slvnlvlogssignals(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. `slvnlvlogssignals` records the logged data in the structure `data`.

`data = slvnlvlogssignals(harness_model)` simulates every test case in `harness_model` and logs the input signals to the Test Unit block in the harness model. You must generate `harness_model` using the Simulink Design Verifier analysis, `sldvmakeharness`, or `slvnlvmakeharness`.

`data = slvnlvlogssignals(harness_model, test_case_index)` simulates every test case in the Signal Builder block of the `harness_model` specified by `test_case_index`. `slvnlvlogssignals` logs the input signals to the Test Unit block in the harness model. If you omit `test_case_index`, `slvnlvlogssignals` simulates every test case in the Signal Builder.

Input Arguments

model_block

Full block path name or handle to a Simulink Model block

harness_model

Name or handle to a harness model that the Simulink Design Verifier software, `sldvmakeharness`, or `slvnlvmakeharness` creates

test_case_index

Array of integers that specifies which test cases in the Signal Builder block of the harness model to simulate

Output Arguments

data

Structure that contains the logged data

Examples

Log simulation data for a Model block. Use the logged data to create a harness model and visualize the data in the referenced model.

- 1 Simulate the CounterB Model block, which references the `sldemo_mdhref_counter` model, in the context of the `sldemo_mdhref_basic` model and log the data:

```
open_system('sldemo_mdhref_basic');  
data = slvnlvlogs('sldemo_mdhref_basic/CounterB');
```

- 2 Create a harness model for `sldemo_mdhref_counter` using the logged data and the default harness options:

```
load_system('sldemo_mdhref_counter');  
harnessOpts = slvnharnessopts  
[harnessFilePath] = ...  
    slvnmakeharness('sldemo_mdhref_counter', data, ...  
    harnessOpts);
```

See Also

`sldvmakeharness` | `slvnruncgvttest` | `slvnrunttest` | `slvnmakeharness`

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 string with the model name. `slvnvmakeharness` returns the path and file name of the generated harness model in `harnessFilePath`. `slvnvmakeharness` creates an empty harness model; the test harness includes one default test case that specifies the default values for all input signals.

`[harnessFilePath] = slvnvmakeharness(model, dataFile)` generates a test harness from the data file `dataFile`.

`[harnessFilePath] = slvnvmakeharness(model, dataFile, harnessOpts)` generates a test harness from `model` using the `dataFile` and `harnessOpts`, which specifies the harness creation options. Requires `' '` for `dataFile` if `dataFile` is not available.

Input Arguments

model

Handle to a Simulink model or a string with the model name

dataFile

Name of the file containing the data.

Default: `' '`

harnessOpts

A structure whose fields specify the configuration for `slvnvmakeharness`:

| Field | Description |
|--------------------------------|--|
| <code>harnessFilePath</code> | <p>Specifies the file path for creating the harness model. If an invalid path is specified, <code>slvnvmakeharness</code> does not save the harness model, but it creates and opens the harness model. If this option is not specified, the <code>slvnvoptions</code> object is used. If this option is not specified, <code>slvnvmakeharness</code> generates a new harness model and saves it in the MATLAB current folder.</p> <p>Default: ''</p> |
| <code>modelRefHarness</code> | <p>Generates the test harness model that includes model in a Model block. When <code>false</code>, the test harness model includes a copy of model.</p> <p>Default: <code>true</code></p> <hr/> <p>Note: If your model contains bus objects and you set <code>modelRefHarness</code> to <code>true</code>, in the Configuration Parameters > Diagnostics > Connectivity pane, you must set the Mux blocks used to create bus signals parameter to <code>error</code>. For more information, see “Prevent Bus and Mux Mixtures”.</p> |
| <code>usedSignalsOnly</code> | <p>When <code>true</code>, 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.</p> <p>Default: <code>false</code></p> |
| <code>systemTestHarness</code> | <p>When <code>true</code>, generates a SystemTest harness. This option requires <code>dataFile</code> path in addition to <code>model</code>.</p> <p>Default: <code>false</code></p> |

Note: To create a default harnessOpts object, at the MATLAB command prompt, type:

```
slvnvharnessopts
```

Output Arguments

harnessFilePath

String containing the path and file name of the generated harness model

Examples

Create a test harness for the `sldemo_md1ref_house` model using the default options:

```
open_system('sldemo_md1ref_house');  
[harnessfile] = slvnvmakeharness('sldemo_md1ref_house', '', harnessOpts);
```

See Also

`slvnvharnessopts` | `slvnvmergeharness`

slvnvmergedata

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_mdhref_basic` model, which contains three Model blocks that reference the model `sldemo_mdhref_counter`. Log the input signals to the three Model blocks and merge the logged data using `slvnvmergedata`. Simulate the referenced model, `sldemo_mdhref_counter`, for coverage with the merged data and display the coverage results in an HTML file.

```
sldemo_md1ref_basic;  
data1 = slvnvlogsignals('sldemo_md1ref_basic/CounterA');  
data2 = slvnvlogsignals('sldemo_md1ref_basic/CounterB');  
data3 = slvnvlogsignals('sldemo_md1ref_basic/CounterC');  
merged_data = slvnmergedata(data1, data2, data3);  
open_system('sldemo_md1ref_counter');  
runOpts = slvnvruntestopts;  
runOpts.coverageEnabled = true;  
[ outData, initialCov ] = slvnvruntest('sldemo_md1ref_counter', ...  
    merged_data, runOpts);  
cvhtml('Initial coverage', initialCov);
```

See Also

slvnvlogsignals | slvnvmakeharness | slvnvruncgvtest | slvnvruntest |
sldvrun

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 strings the same length as `models`. It defines parameter settings for the test cases of each test harness model.

If `name` does not exist, `slvnvmergeharness` creates it as a copy of the first model in `models`. `slvnvmergeharness` then merges data from other models listed in `models` into this model. If you create `name` from a previous `slvnvmergeharness` run, subsequent runs of `slvnvmergeharness` for `name` maintain the structure and initialization from the earlier run. If `name` matches an existing Simulink model, `slvnvmergeharness` merges the test data from `models` into `name`.

`slvnvmergeharness` assumes that `name` and the rest of the models in `models` have only one Signal Builder block on the top level. If a model in `models` does not meet this restriction or its top-level Signal Builder block does not have the same number of signals as the top-level Signal Builder block in `name`, `slvnvmergeharness` does not merge that model's test data into `name`.

Input Arguments

name

Name of the new harness model, to be stored in the default MATLAB folder

Default:**models**

A cell array of strings that represent harness model names

initialization_commands

A cell array of strings the same length as `models`. `initialization_commands` defines parameter settings for the test cases of each test harness model.

Output Arguments

status

If the function saves the data and initialization commands in name, `slvnvmergeharness` returns a status of 1. Otherwise, it returns 0.

Examples

Log the input signals to the three Model blocks in the `sldemo_mdhref_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_mdhref_basic');
data1 = slvnvlogsignals('sldemo_mdhref_basic/CounterA');
data2 = slvnvlogsignals('sldemo_mdhref_basic/CounterB');
data3 = slvnvlogsignals('sldemo_mdhref_basic/CounterC');
open_system('sldemo_mdhref_counter');
harness1FilePath = slvnvmakeharness('sldemo_mdhref_counter', data1);
harness2FilePath = slvnvmakeharness('sldemo_mdhref_counter', data2);
harness3FilePath = slvnvmakeharness('sldemo_mdhref_counter', data3);
[-, harness1] = fileparts(harness1FilePath);
[-, harness2] = fileparts(harness2FilePath);
[-, harness3] = fileparts(harness3FilePath);
slvnvmergeharness('new_harness_model',{harness1, harness2, harness3});
```

See Also

`slvnvlogsignals` | `slvnvmakeharness`

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 `slvnvruncgvttest`.

| Field Name | Description |
|-----------------------------|---|
| <code>testIdx</code> | <p>Test case index array to simulate from <code>dataFile</code>.</p> <p>If <code>testIdx = []</code> (the default), <code>slvnvruncgvttest</code> simulates all test cases.</p> |
| <code>allowCopyModel</code> | <p>Specifies to create and configure the model if you have not configured it for executing test cases with the CGV API.</p> <p>If <code>true</code> and you have not configured your model to execute test cases with the CGV API, <code>slvnvruncgvttest</code> copies the model, fixes the configuration, and executes the test cases on the copied model.</p> <p>If <code>false</code> (the default), an error occurs if the tests cannot execute with the CGV API.</p> <hr/> <p>Note: If you have not configured the top-level model or any referenced models to execute test cases, <code>slvnvruncgvttest</code> does not copy the model, even if <code>allowCopyModel</code> is <code>true</code>. An error occurs.</p> |
| <code>cgvCompType</code> | <p>Defines the software-in-the-loop (SIL) or processor-in-the-loop (PIL) approach for CGV:</p> <ul style="list-style-type: none"> • 'topmodel' (default) • 'modelblock' |
| <code>cgvConn</code> | <p>Specifies mode of execution for CGV:</p> <ul style="list-style-type: none"> • '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 |
|--------------------------------------|---|
| <code>tout_slvnvruncgvtest</code> | Simulation time |
| <code>xout_slvnvruncgvtest</code> | State data |
| <code>yout_slvnvruncgvtest</code> | Output signal data |
| <code>logcout_slvnvruncgvtest</code> | Signal logging data for: <ul style="list-style-type: none"> • Signals connected to outputs • Signals that are configured for logging on the model |

Examples

Open the `sldemo_mdhref_basic` example model and log the input signals to the CounterA Model block.

```
open_system('sldemo_mdhref_basic');
load_system('sldemo_mdhref_counter');
loggedData = slvnvlogsignals('sldemo_mdhref_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_mdhref_counter', loggedData, runOpts);
runOpts.cgvConn = 'sil';
```

```
cgvObjectSil = slvnvruncgvtest('sldemo_mdhref_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`

slvnvruntime

Simulate model using input data

Syntax

```
outData = slvnvruntime(model, dataFile)
outData = slvnvruntime(model, dataFile, runOpts)
[outData, covData] = slvnvruntime(model, dataFile, runOpts)
```

Description

`outData = slvnvruntime(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 = slvnvruntime(model, dataFile, runOpts)` simulates model using all the test cases in `dataFile`. `runOpts` defines the options for simulating the test cases.

`[outData, covData] = slvnvruntime(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. `slvnvruntime` returns the coverage data in the `covData` 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 `slvnvrntest`.

| Field | Description |
|--------------------------------------|---|
| <code>testIdx</code> | <p>Test case index array to simulate from <code>dataFile</code>. If <code>testIdx</code> is <code>[]</code>, <code>slvnvrntest</code> simulates all test cases.</p> <p>Default: <code>[]</code></p> |
| <code>signalLoggingSaveFormat</code> | <p>Specifies signal logging data format for:</p> <ul style="list-style-type: none"> • Signals connected to the outputs of the model • Intermediate signals that are already configured for logging <p>Valid values are:</p> <ul style="list-style-type: none"> • <code>'Dataset'</code> (default) — <code>slvnvrntest</code> stores the data in <code>Simulink.SimulationData.Dataset</code> objects. • <code>'ModelDataLogs'</code> — <code>slvnvrntest</code> stores the data in <code>Simulink.ModelDataLogs</code> objects. |
| <code>coverageEnabled</code> | <p>If <code>true</code>, specifies that the Simulink Verification and Validation software collect model coverage data during simulation.</p> <p>Default: <code>false</code></p> |
| <code>coverageSetting</code> | <p><code>cvtest</code> object for collecting model coverage. If <code>[]</code>, <code>slvnvrntest</code> uses the existing coverage settings for model.</p> <p>Default: <code>[]</code></p> |

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 |
|----------------------------------|--|
| <code>tout_slvnvruntest</code> | Simulation time |
| <code>xout_slvnvruntest</code> | State data |
| <code>yout_slvnvruntest</code> | Output signal data |
| <code>logout_slvnvruntest</code> | Signal logging data for: <ul style="list-style-type: none"> • 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_mdref_basic` model and log the input signals to the CounterA Model block:

```
open_system('sldemo_mdref_basic');
loggedData = slvnvlogsignals('sldemo_mdref_basic/CounterA');
```

Using the logged signals, simulate the model referenced in the Counter block (`sldemo_mdref_counter`):

```
runOpts = slvnvruntestopts;
runOpts.coverageEnabled = true;
open_system('sldemo_mdref_counter');
[ outData ] = slvnvruntest('sldemo_mdref_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('logcout_slvnvrntest')});  
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` | `slvnvrntestopts`

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 |
|---|---|
| <code>testIdx</code> | Test case index array to simulate or execute from data file. If <code>testIdx = []</code> , all test cases are simulated or executed. Default: <code>[]</code> |
| <code>SignalLogging</code> <code>SaveFormat</code> | Available only for <code>slvnvruntest</code> . Specifies format for signal logging data for signals connected to the outputs of the model and for intermediate signals configured for logging. |

| Field Name | Description |
|-----------------|---|
| | <ul style="list-style-type: none">• 'Dataset' — Data will be stored in <code>Simulink.SimulationData.Dataset</code> objects.• 'ModelDataLogs' — Data will be stored in <code>Simulink.ModelDataLogs</code> objects. <p>Default: 'Dataset'</p> |
| coverageEnabled | Available only for <code>slvnvruntime</code> . If <code>true</code> , <code>slvnvruntime</code> collects model coverage data during simulation. Default: <code>false</code> |
| coverageSetting | Available only for <code>slvnvruntime</code> . <code>cvtest</code> object to use for collecting model coverage. If <code>coverageSetting</code> is <code>[]</code> , <code>slvnvruntime</code> uses the coverage settings for the model specified in the call to <code>slvnvruntime</code> . Default: <code>[]</code> |

| Field Name | Description |
|----------------|---|
| allowCopyModel | <p>Available only for <code>slvnvruncgvttest</code>.</p> <p>Specifies to create and configure the model if you have not configured it to execute test cases with the CGV API.</p> <p>If <code>true</code> and you have not configured the model to execute test cases with the CGV API, <code>slvnvruncgvttest</code> copies the model, fixes the configuration, and executes the test cases on the copied model.</p> <p>If <code>false</code>, an error occurs if the tests cannot execute with the CGV API.</p> <hr/> <p>Note: If you have not configured the top-level model or any referenced models to execute test cases, <code>slvnvruncgvttest</code> does not copy the model, even if <code>allowCopyModel</code> is <code>true</code>. An error occurs.</p> <hr/> <p>Default:<code>false</code></p> |
| cgvCompType | <p>Available only for <code>slvnvruncgvttest</code>.</p> <p>Defines the software-in-the-loop (SIL) or processor-in-the-loop (PIL) approach for CGV:</p> <ul style="list-style-type: none"> • <code>'topmodel'</code> • <code>'modelblock'</code> <p>Default: <code>'topmodel'</code></p> |

| Field Name | Description |
|------------|---|
| cgvConn | Available only for <code>slvnvruncgvtest</code> . Specifies mode of execution for CGV: <ul style="list-style-type: none">• '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`

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:

| | |
|--------------------------------|---|
| <code>covered_intervals</code> | Number of interpolation/extrapolation intervals satisfied for object |
| <code>total_intervals</code> | Total number of interpolation/extrapolation intervals for object |

coverage is empty if `cvdo` does not contain lookup table coverage results for **object**.

exeCounts

An array having the same dimensionality as the lookup table block; its size has been extended to allow for the lookup table extrapolation intervals.

Examples

Collect lookup table coverage for the `slvndemo_cv_small_controller` model and determine the percentage of interpolation/extrapolation intervals coverage collected for the Gain Table block in the Gain subsystem:

```
mdl = 'slvndemo_cv_small_controller';
open_system(mdl)
```

```
%Create test spec object
testObj = cvtest mdl
%Enable lookup table coverage
testObj.settings.tableExec = 1;
%Simulate the model
data = cvsim(testObj)
blk_handle = get_param([mdl, '/Gain/Gain Table'], 'Handle');
%Retrieve l/u table coverage
cov = tableinfo(data, blk_handle)
%Percent MC/DC outcomes covered
percent_cov = 100 * cov(1) / cov(2)
```

Alternatives

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

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

More About

- “Lookup Table Coverage”

See Also

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

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

String

Default: ' ' (null string)

Description

The **Description** property specifies the message displayed in the Action box.

Examples

```
% define action (fix) operation
myAction = ModelAdvisor.Action;
%Specify a callback function for the action
myAction.setCallbackFcn(@sampleActionCB);
myAction.Name='Fix block fonts';
myAction.Description=...
    'Click the button to update all blocks with specified font';
```

Description property

Class: ModelAdvisor.FactoryGroup

Package: ModelAdvisor

Description of folder

Values

String

Default: '' (null string)

Description

The `Description` property provides information about the folder. Details about the folder are displayed in the right pane of the Model Advisor.

Examples

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

Description property

Class: ModelAdvisor.Group

Package: ModelAdvisor

Description of folder

Values

String

Default: '' (null string)

Description

The `Description` property provides information about the folder. Details about the folder are displayed in the right pane of the Model Advisor.

Examples

```
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');  
MAG.Description='This is my group';
```

Description property

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Description of input parameter

Values

String.

Default: '' (null string)

Description

The `Description` property specifies a description of the input parameter. Details about the check are displayed in the right pane of the Model Advisor.

Examples

```
% define input parameters
inputParam2 = ModelAdvisor.InputParameter;
inputParam2.Name = 'Standard font size';
inputParam2.Value='12';
inputParam2.Type='String';
inputParam2.Description='sample tooltip';
```


Description property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Description of task

Values

String

Default: '' (null string)

Description

The **Description** property is a description of the task that the Model Advisor displays in the **Analysis** box.

When adding checks as tasks, the Model Advisor uses the task **Description** property instead of the check **TitleTips** property.

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.DisplayName='Example task 1';  
MAT1.Description='This is the first example task.'
```

```
MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');  
MAT2.DisplayName='Example task 2';  
MAT2.Description='This is the second example task.'
```

```
MAT3 = ModelAdvisor.Task('com.mathworks.sample.TaskSample3');  
MAT3.DisplayName='Example task 3';  
MAT3.Description='This is the third example task.'
```

DisplayName property

Class: ModelAdvisor.FactoryGroup

Package: ModelAdvisor

Name of folder

Values

String

Default: ' ' (null string)

Description

The `DisplayName` specifies the name of the folder that is displayed in the Model Advisor.

Examples

```
% --- 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

String

Default: ' ' (null string)

Description

The `DisplayName` specifies the name of the folder that is displayed in the Model Advisor.

Examples

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

DisplayName property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Name of task

Values

String

Default: '' (null string)

Description

The `DisplayName` property specifies the name of the task. The Model Advisor displays each custom task in the tree using the name of the task. Therefore, you should specify a unique name for each task. When you specify the same name for multiple tasks, the Model Advisor generates a warning.

When adding checks as tasks, the Model Advisor uses the task `DisplayName` property instead of the check `Title` property.

Examples

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

```
MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');  
MAT2.DisplayName='Example task 2';
```

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

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

String

Default: '' (null string)

Description

The ID property specifies a permanent, unique identifier for the check. Note the following about the ID property:

- You must specify this property.
- The value of ID must remain constant.
- The Model Advisor generates an error if ID is not unique.
- Tasks and factory group definitions must refer to checks by ID.

ID property

Class: ModelAdvisor.FactoryGroup

Package: ModelAdvisor

Identifier for folder

Values

String

Description

The ID property specifies a permanent, unique identifier for the folder.

Note:

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

ID property

Class: ModelAdvisor.Group

Package: ModelAdvisor

Identifier for folder

Values

String

Description

The ID property specifies a permanent, unique identifier for the folder.

Note:

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

ID property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Identifier for task

Values

String

Default: '' (null string)

Description

The ID property specifies a permanent, unique identifier for the task.

Note:

- The Model Advisor automatically assigns a string to **ID** if you do not specify it.
 - The value of **ID** must remain constant.
 - The Model Advisor generates an error if **ID** is not unique.
 - Group definitions must refer to tasks using **ID**.
-

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.ID='Task_ID_1234';
```

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 = cvsimsim(topModelName);  
cvdg.name = 'My_Data_Group';
```

Name property

Class: ModelAdvisor.Action

Package: ModelAdvisor

Action button label

Values

String

Default: '' (null string)

Description

The `Name` property specifies the label for the action button. This property is required.

Examples

```
% define action (fix) operation
myAction = ModelAdvisor.Action;
%Specify a callback function for the action
myAction.setCallbackFcn(@sampleActionCB);
myAction.Name='Fix block fonts';
```

Name property

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Input parameter name

Values

String.

Default: '' (null string)

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

String

Default: '' (null string)

Description

The **Name** property specifies an entry in the **Show** drop-down list in the Model Advisor Result Explorer.

Examples

```
% define list view parameters
myLVParam = ModelAdvisor.ListViewParameter;
myLVParam.Name = 'Invalid font blocks'; % the name appeared at pull down filter
```

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.

| | |
|----------------------|--|
| <code>'true'</code> | Check supports library models. |
| <code>'false'</code> | 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

String

Default: '' (null string)

Description

The **Title** property specifies the name of the check in the Model Advisor. The Model Advisor displays each custom check in the tree using the title of the check. Therefore, you should specify a unique title for each check. When you specify the same title for multiple checks, the Model Advisor generates a warning.

Examples

```
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');  
rec.Title = 'Check Simulink block font';
```

TitleTips property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Description of check

Values

String

Default: '' (null string)

Description

The `TitleTips` property specifies a description of the check. Details about the check are displayed in the right pane of the Model Advisor.

Examples

```
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');  
rec.Title = 'Check Simulink block font';  
rec.TitleTips = 'Example style three callback';
```

Type property

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Input parameter type

Values

String.

Default: ' ' (null string)

Description

The **Type** property specifies the type of input parameter.

Use the **Type** property with the **Value** and **Entries** properties to define input parameters.

Valid values are listed in the following table.

| Type | Data Type | Default Value | Description |
|----------|------------|-------------------------|--|
| Bool | Boolean | false | A check box |
| ComboBox | Cell array | First entry in the list | A drop-down menu <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <code>Entries</code> is called. |
| String | String | ' ' (null string) | A text box |

Examples

```
% define input parameters
inputParam1 = ModelAdvisor.InputParameter;
inputParam1.Name = 'Skip font checks.';
inputParam1.Type = 'Bool';
inputParam1.Value = false;
```

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 (string)

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.

| | |
|---------|-------------------|
| '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
```

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';
```

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 `slvndemo_mdldv_config` configuration file:

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

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

% View the 'Identify unconnected...' check result.
view(SysResultObjArray{1}.CheckResultObjs(1))
```

Alternatives

“View Model Advisor Report”

More About

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

See Also

`ModelAdvisor.run` | `ModelAdvisor.summaryReport` | `viewReport`

Tutorials

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

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 = 'slvndemo_mdldv_config.mat';
SysList={'sldemo_auto_climatecontrol/Heater Control',...
```

```

    'sldemo_auto_climatecontrol/AC Control'};

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

% Open the Model Advisor report.
viewReport(SysResultObjArray{1})

```

Open Model Advisor and display results for sldemo_auto_climatecontrol/Heater Control.

```

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

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

% Open the Model Advisor and display results.
viewReport(SysResultObjArray{1}, 'MA')

```

Display results in the Command Window for sldemo_auto_climatecontrol/Heater Control.

```

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

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

% Display results in the Command Window.
viewReport(SysResultObjArray{1}, 'Cmd')

```

Alternatives

- “View Model Advisor Report”
- “View Results in Model Advisor GUI”
- “View Results in Command Window”

More About

- “Automating Check Execution”

- “Archive and View Model Advisor Run Results”

See Also

`ModelAdvisor.run` | `ModelAdvisor.summaryReport` | `view`

Tutorials

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

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';
```

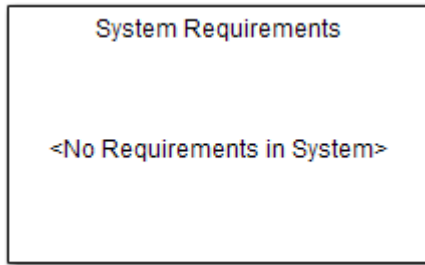

Block Reference

System Requirements

List system requirements in Simulink diagrams

Library

Simulink Verification and Validation

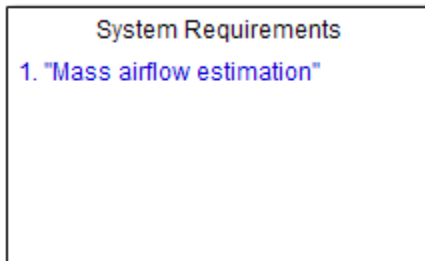


Description

The System Requirements block lists all the system requirements associated with the model or subsystem depicted in the current diagram. It does not list requirements associated with individual blocks in the diagram.

You can place this block anywhere in a diagram. It is not connected to other Simulink blocks. You can only have one System Requirements block in a diagram.

When you drag the System Requirements block from the Library Browser into your Simulink diagram, it is automatically populated with the system requirements, as shown.

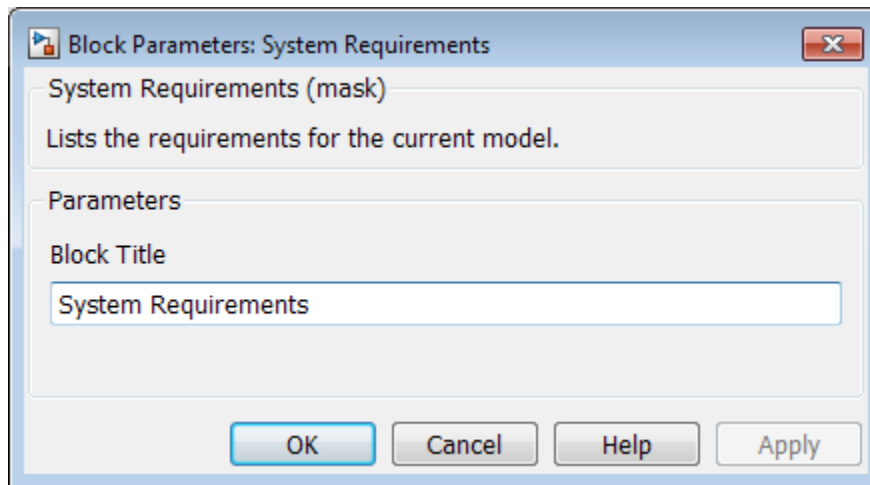


Each of the listed requirements is an active link to the actual requirements document. When you double-click on a requirement name, the associated requirements document opens in its editor window, scrolled to the target location.

If the System Requirements block exists in a diagram, it automatically updates the requirements listing as you add, modify, or delete requirements for the model or subsystem.

Dialog Box and Parameters

To access the Block Parameters dialog box for the System Requirements block, right-click on the System Requirements block and, from the context menu, select **Mask Parameters**. The Block Parameters dialog box opens, as shown.



The Block Parameters dialog box for the System Requirements block contains one parameter.

Block Title

The title of the system requirements list in the diagram. The default title is **System Requirements**. You can type a customized title, for example, **Engine Requirements**.

Model Advisor Checks

- “Simulink Verification and Validation Checks” on page 3-2
- “DO-178C/DO-331 Checks” on page 3-7
- “IEC 61508, ISO 26262, and EN 50128 Checks” on page 3-66
- “MathWorks Automotive Advisory Board Checks” on page 3-95
- “Requirements Consistency Checks” on page 3-145

Simulink Verification and Validation Checks

In this section...

“Simulink Verification and Validation Checks” on page 3-2

“Modeling Standards Checks” on page 3-3

“Modeling Standards for MAAB ” on page 3-3

“Naming Conventions” on page 3-3

“Model Architecture” on page 3-4

“Model Configuration Options ” on page 3-4

“Simulink” on page 3-5

“Stateflow ” on page 3-5

“MATLAB Functions” on page 3-5

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, ISO 26262, and EN 50128 Checks” on page 3-66
- “MathWorks Automotive Advisory Board Checks” on page 3-95

For descriptions of the requirements consistency checks, see “Requirements Consistency Checks” on page 3-145.

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, ISO 26262, and EN 50128 Checks” on page 3-66
- “MathWorks Automotive Advisory Board Checks” on page 3-95

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

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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

- “Run Model Checks”
- “Simulink Checks”
- “Simulink Coder Checks”
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

Check safety-related optimization settings

Check model configuration for optimization settings that can impact safety.

Description

This check verifies that model optimization configuration parameters are set optimally for generating code for a safety-related application. Although highly optimized code is desirable for most real-time systems, some optimizations can have undesirable side effects that impact safety.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <p>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.)</p> | <p>Clear the Block reduction check box on the Optimization pane of the Configuration Parameters dialog box or set the parameter <code>BlockReduction</code> to <code>off</code>.</p> |
| <p>Implementation of logic signals as Boolean data is cleared. Strong data typing is recommended for safety-related code. (See DO-331, Section MB.6.3.1.e—High-level requirements conform to standards, DO-331, Section MB.6.3.2.e—Low-level requirements conform to standards, and MISRA-C:2004, Rule 12.6.)</p> | <p>Select Implement logic signals as boolean data (vs. double) on the Optimization pane of the Configuration Parameters dialog box or set the parameter <code>BooleanDataType</code> to <code>on</code>.</p> |
| <p>The model includes blocks that depend on elapsed or absolute time and is configured to minimize the amount of memory allocated for the timers. Such a configuration limits the number of days the application can execute before a timer overflow occurs. Many aerospace products are powered on continuously and timers should not assume a limited lifespan. (See DO-331, Section MB.6.3.1.g—Algorithms are accurate, DO-331, Section MB.6.3.2.g—Algorithms are accurate, and MISRA-C:2004, Rule 12.11.)</p> | <p>Set Application lifespan (days) on the Optimization pane of the Configuration Parameters dialog box or set the parameter <code>LifeSpan</code> to <code>inf</code>.</p> |

| Condition | Recommended Action |
|---|---|
| <p>The optimization that suppresses the generation of initialization code for root-level inports and outports that are set to zero is selected. For safety-related code, you should explicitly initialize all variables. (See DO-331, Section MB.6.3.3.b—Software architecture is consistent and MISRA-C:2004, Rule 9.1.)</p> | <p>If you have a Embedded Coder license, and you are using an ERT-based system target file, clear the Remove root level I/O zero initialization check box on the Optimization pane of the Configuration Parameters dialog box or set the parameter <code>ZeroExternalMemoryAtStartup</code> to on. Alternatively, integrate external, hand-written code that initializes all I/O variables to zero explicitly.</p> |
| <p>The optimization that suppresses the generation of initialization code for internal work structures, such as block states and block outputs that are set to zero, is selected. For safety-related code, you should explicitly initialize every variable. (See DO-331, Section MB.6.3.3.b—Software architecture is consistent and MISRA-C:2004, Rule 9.1.)</p> | <p>If you have a Embedded Coder license, and you are using an ERT-based system target file, clear the Remove internal data zero initialization check box on the Optimization pane of the Configuration Parameters dialog box or set the parameter <code>ZeroInternalMemoryAtStartup</code> to on. Alternatively, integrate external, hand-written code that initializes every state variable to zero explicitly.</p> |
| <p>The optimization that suppresses generation of code resulting from floating-point to integer conversions that wrap out-of-range values is cleared. You must avoid overflows for safety-related code. When this optimization is off and your model includes blocks that disable the 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, DO-331, Section MB.6.3.2.g—Algorithms are accurate, and MISRA-C:2004, Rule 12.11.)</p> | <p>If you have a Simulink Coder™ license, select Remove code from floating-point to integer conversions that wraps out-of-range values on the Optimization pane of the Configuration Parameters dialog box or set the parameter <code>EfficientFloat2IntCast</code> to on.</p> |

| 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:2004, Rule 21.1.) | If you have a 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 of the Configuration Parameters dialog box or set the parameter <code>NoFixptDivByZeroProtection</code> to <code>off</code> . |
| 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 a 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 of 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.

See Also

- “Optimization Pane: General” in the Simulink graphical user interface documentation
- “Optimize Buffers in the Generated Code” in the Simulink Coder documentation
- “Optimize Generated Code Using Specified Minimum and Maximum Values” in the Embedded Coder documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “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 model configuration for diagnostic settings that apply to solvers and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to solvers are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>The diagnostic for detecting automatic breakage of algebraic loops is set to none or warning. The breaking of algebraic loops can affect the predictability of the order of block execution. For safety-related applications, a model developer needs to know when such breaks occur. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set Algebraic loop on the Diagnostics > Solver pane of the Configuration Parameters dialog box or set the parameter AlgebraicLoopMsg to error. Consider breaking such loops explicitly with Unit Delay blocks so that the execution order is predictable. At a minimum, verify that the results of loops breaking automatically are acceptable.</p> |
| <p>The diagnostic for detecting automatic breakage of algebraic loops for Model blocks, atomic subsystems, and enabled subsystems is set to none or warning. The breaking of algebraic loops can affect the predictability of the order of block execution. For safety-related applications, a model developer needs to know when such breaks occur. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set Minimize algebraic loop on the Diagnostics > Solver pane of the Configuration Parameters dialog box or set the parameter ArtificialAlgebraicLoopMsg to error. Consider breaking such loops explicitly with Unit Delay blocks so that the execution order is predictable. At a minimum, verify that the results of loops breaking automatically are acceptable.</p> |

| Condition | Recommended Action |
|--|--|
| <p>The diagnostic for detecting potential conflict in block execution order is set to none or warning. For safety-related applications, block execution order must be predictable. A model developer needs to know when conflicting block priorities exist. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set Block priority violation on the Diagnostics > Solver pane of the Configuration Parameters dialog box or set the parameter BlockPriorityViolationMsg to error.</p> |
| <p>The diagnostic for detecting whether a model contains an S-function that has not been specified explicitly to inherit sample time is set to none or warning. These settings can result in unpredictable behavior. A model developer needs to know when such an S-function exists in a model so it can be modified to produce predictable behavior. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set Unspecified inheritability of sample times on the Diagnostics > Solver pane of the Configuration Parameters dialog box or set the parameter UnknownTsInhSupMsg to error.</p> |
| <p>The diagnostic for detecting whether the Simulink software automatically modifies the solver, step size, or simulation stop time is set to none or warning. Such changes can affect the operation of generated code. For safety-related applications, it is better to detect such changes so a model developer can explicitly set the parameters to known values. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set Automatic solver parameter selection on the Diagnostics > Solver pane of the Configuration Parameters dialog box or set the parameter SolverPrmCheckMsg to error.</p> |
| <p>The diagnostic for detecting when a name is used for more than one state in the model is set to none. State names within a model should be unique. For safety-related applications, it is better to detect name clashes so a model developer can fix them. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set State name clash on the Diagnostics > Solver pane of the Configuration Parameters dialog box or set the parameter StateNameClashWarn to warning.</p> |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to solvers and that can impact safety.

See Also

- “Diagnostics Pane: Solver” in the Simulink graphical user interface documentation
- “Manage Errors and Warnings” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0043: Configuration Parameters > Diagnostics > Solver”

Check safety-related diagnostic settings for sample time

Check model configuration for diagnostic settings that apply to sample time and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to sample times are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <p>The diagnostic for detecting when a source block, such as a Sine Wave block, inherits a sample time (specified as -1) is set to none or warning. The use of inherited sample times for a source block can result in unpredictable execution rates for the source block and blocks connected to it. For safety-related applications, source blocks should have explicit sample times to prevent incorrect execution sequencing. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set Source block specifies -1 sample time on the Diagnostics > Sample Time pane of the Configuration Parameters dialog box or set the parameter <code>InheritedTsInSrcMsg</code> to error.</p> |

| Condition | Recommended Action |
|--|--|
| <p>The diagnostic for detecting whether the input for a discrete block, such as the Unit Delay block, is a continuous signal is set to none or warning. Signals with continuous sample times should not be used for embedded real-time code. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set Discrete used as continuous on the Diagnostics > Sample Time pane of the Configuration Parameters dialog box or set the parameter <code>DiscreteInheritContinuousMsg</code> to error.</p> |
| <p>The diagnostic for detecting invalid rate transitions between two blocks operating in multitasking mode is set to none or warning. Such rate transitions should not be used for embedded real-time code. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set Multitask rate transition on the Diagnostics > Sample Time pane of the Configuration Parameters dialog box or set the parameter <code>MultiTaskRateTransMsg</code> to error.</p> |
| <p>The diagnostic for detecting subsystems that can cause data corruption or nondeterministic behavior is set to none or warning. This diagnostic detects whether conditionally executed multirate subsystems (enabled, triggered, or function-call subsystems) operate in multitasking mode. Such subsystems can corrupt data and behave unpredictably in real-time environments that allow preemption. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set Multitask conditionally executed subsystem on the Diagnostics > Sample Time pane of the Configuration Parameters dialog box or set the parameter <code>MultiTaskCondExecSysMsg</code> to error.</p> |
| <p>The diagnostic for checking sample time consistency between a Signal Specification block and the connected destination block is set to none or warning. An over-specified sample time can result in an unpredictable execution rate. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.)</p> | <p>Set Enforce sample times specified by Signal Specification blocks on the Diagnostics > Sample Time pane of the Configuration Parameters dialog box or set the parameter <code>SigSpecEnsureSampleTimeMsg</code> to error.</p> |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to sample time and that can impact safety.

See Also

- “Diagnostics Pane: Sample Time” in the Simulink graphical user interface documentation
- “Manage Errors and Warnings” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0044: Configuration Parameters > Diagnostics > Sample Time”

Check safety-related diagnostic settings for signal data

Check model configuration for diagnostic settings that apply to signal data and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to signal data are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The diagnostic that specifies how the Simulink software resolves signals associated with “Simulink.Signal” objects in the MATLAB workspace 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 of 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. |

| Condition | Recommended Action |
|--|---|
| <p>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:2004, Rule 21.1.)</p> | <p>Set Division by singular matrix on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter <code>CheckMatrixSingularityMsg</code> to error.</p> |
| <p>The diagnostic that detects when the Simulink software cannot infer the data type of a signal during data type propagation is set to none or warning. For safety-related applications, model developers must verify the data types of signals. (See DO-331, Section MB.6.3.1.e – High-level requirements conform to standards, and DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards.)</p> | <p>Set Underspecified data types on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter <code>UnderSpecifiedDataTypeMsg</code> to error.</p> |
| <p>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:2004, Rule 21.1.)</p> | <p>Set Wrap on overflow on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter <code>IntegerOverflowMsg</code> to error.</p> |
| <p>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:2004, Rule 21.1.)</p> | <p>Set Saturate on overflow on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter <code>IntegerSaturationMsg</code> to error.</p> |

| Condition | Recommended Action |
|--|---|
| <p>The diagnostic that detects when the value of a block output signal is Inf or NaN at the current time step is set to none or warning. When this type of block output signal condition occurs, numeric exceptions can result, and numeric exceptions are not acceptable in safety-related applications. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p> | <p>Set Inf or NaN block output on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter SignalInfNanChecking to error.</p> |
| <p>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.)</p> | <p>Set "rt" prefix for identifiers on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter RTPrefix to error.</p> |
| <p>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:2004, Rule 21.1.)</p> | <p>Set Simulation range checking on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter SignalRangeChecking to error.</p> |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to signal data and that can impact safety.

See Also

- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation
- “Manage Errors and Warnings” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0005: Usage of Product blocks”

Check safety-related diagnostic settings for parameters

Check model configuration for diagnostic settings that apply to parameters and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to parameters are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| <p>The diagnostic that detects when a parameter downcast occurs is set to none or warning. A downcast to a lower signal range can result in numeric overflows of parameters, resulting in unexpected behavior. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p> | <p>Set Detect downcast on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter <code>ParameterDowncastMsg</code> to error.</p> |
| <p>The diagnostic that detects when a parameter underflow occurs is set to none or warning. When the data type of a parameter does not have enough resolution, the parameter value</p> | <p>Set Detect underflow on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter <code>ParameterUnderflowMsg</code> to error.</p> |

| Condition | Recommended Action |
|---|--|
| <p>is zero instead of the specified value. This can lead to incorrect operation of generated code. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p> | |
| <p>The diagnostic that detects when a parameter overflow occurs is set to none or warning. Numeric overflows can result in unexpected application behavior and should be detected and fixed in safety-related applications. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rule 21.1.)</p> | <p>Set Detect overflow on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter <code>ParameterOverflowMsg</code> to error.</p> |
| <p>The diagnostic that detects when a parameter loses precision is set to none or warning. Not detecting such errors can result in a parameter being set to an incorrect value in the generated code. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rules 10.1, 10.2, 10.3, and 10.4.)</p> | <p>Set Detect precision loss on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter <code>ParameterPrecisionLossMsg</code> to error.</p> |
| <p>The diagnostic that detects when an expression with tunable variables is reduced to its numerical equivalent is set to none or warning. This can result in a tunable parameter unexpectedly not being tunable in generated code. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)</p> | <p>Set Detect loss of tunability on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter <code>ParameterTunabilityLossMsg</code> to error.</p> |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to parameters and that can impact safety.

See Also

- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation
- “Manage Errors and Warnings” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C, Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0302: Configuration Parameters > Diagnostics > Data Validity > Parameters”

Check safety-related diagnostic settings for data used for debugging

Check model configuration for diagnostic settings that apply to data used for debugging and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to debugging are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The diagnostic that enables model verification blocks is set to Use local settings or Enable all . Such blocks should be disabled because they are assertion blocks, which are for verification only. Model developers should not use assertions in embedded code. | Set Model Verification block enabling on the Diagnostics > Data Validity pane of the Configuration Parameters dialog box or set the parameter AssertControl to Disable All . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to data used for debugging and that can impact safety.

See Also

- DO-331, Section MB.6.3.1.e – High-level requirements conform to standards
- DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards
- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

Check safety-related diagnostic settings for data store memory

Check model configuration for diagnostic settings that apply to data store memory and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to data store memory are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The diagnostic that detects whether the model attempts to read data from a data store in which it has not stored data in the current time step is set to a value other than 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 of 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 of the Configuration Parameters dialog box or set the parameter WriteAfterReadMsg to Enable all as errors . |

| Condition | Recommended Action |
|---|--|
| The diagnostic that detects whether the model attempts to store data in a data store twice in succession in the current time step is set to a value other than 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 of 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 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. | Set Multitask data store on the Diagnostics > Data Validity pane of the Configuration 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.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0013: Usage of data store blocks”

Check safety-related diagnostic settings for type conversions

Check model configuration for diagnostic settings that apply to type conversions and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to type conversions are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| <p>The diagnostic that detects Data Type Conversion blocks used where there is not type conversion is set to none. The Simulink software might remove unnecessary Data Type Conversion blocks from generated code. This might result in requirements without corresponding code. The removal of such blocks need to be detected so model developers can remove the unnecessary blocks explicitly. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)</p> | <p>Set Unnecessary type conversions on the Diagnostics > Type Conversion pane of the Configuration Parameters dialog box or set the parameter <code>UnnecessaryDatatypeConvMsg</code> to warning.</p> |
| <p>The diagnostic that detects vector-to-matrix or matrix-to-vector conversions at block inputs is set to none or warning. When the Simulink software automatically converts between vector and matrix dimensions, unintended operations or unpredictable behavior can occur. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)</p> | <p>Set Vector/matrix block input conversion on the Diagnostics > Type Conversion pane of the Configuration Parameters dialog box or set the parameter <code>VectorMatrixConversionMsg</code> to error.</p> |
| <p>The diagnostic that detects when a 32-bit integer value is converted to a floating-point value is set to none. This type of conversion can result in a loss of precision due to truncation of the least significant bits for large integer values. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA-C:2004, Rules 10.1, 10.2, 10.3, and 10.4.)</p> | <p>Set 32-bit integer to single precision float conversion on the Diagnostics > Type Conversion pane of the Configuration Parameters dialog box or set the parameter <code>Int32ToFloatConvMsg</code> to warning.</p> |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to type conversions and that can impact safety.

See Also

- “Diagnostics Pane: Type Conversion” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0309: Configuration Parameters > Diagnostics > Type Conversion”

Check safety-related diagnostic settings for signal connectivity

Check model configuration for diagnostic settings that apply to signal connectivity and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to signal connectivity are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| 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 of the Configuration Parameters dialog box or set the parameter <code>SignalLabelMismatchMsg</code> 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 of the Configuration Parameters dialog box or set the parameter <code>UnconnectedInputMsg</code> to error . |

| Condition | Recommended Action |
|---|---|
| The diagnostic that detects when the model contains a block with an unconnected output signal is set to none or warning . This must be detected because dead code can result from unconnected block output signals. | Set Unconnected block output ports on the Diagnostics > Connectivity pane of the Configuration Parameters dialog box or set the parameter <code>UnconnectedOutputMsg</code> 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 of the Configuration Parameters dialog box or set the parameter <code>UnconnectedLineMsg</code> to error . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to signal connectivity and that can impact safety.

See Also

- DO-331, Section MB.6.3.1.e – High-level requirements conform to standards
- DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards
- “Diagnostics Pane: Connectivity” in the Simulink graphical user interface documentation
- “Signal Basics” in the Simulink documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0306: Configuration Parameters > Diagnostics > Connectivity > Signals”

Check safety-related diagnostic settings for bus connectivity

Check model configuration for diagnostic settings that apply to bus connectivity and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to bus connectivity are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>The diagnostic that detects whether a Model block's root Outputport block is connected to a bus but does not specify a bus object is set to none or warning. For a bus signal to cross a model boundary, the signal must be defined as a bus object for compatibility with higher level models that use a model as a reference model.</p> | <p>Set Unspecified bus object at root Outputport block on the Diagnostics > Connectivity pane of the Configuration Parameters dialog box or set the parameter <code>RootOutputportRequireBusObject</code> to error.</p> |
| <p>The diagnostic that detects whether the name of a bus element matches the name specified by the corresponding bus object is set to none or warning. This diagnostic prevents the use of incompatible buses in a bus-capable block such that the output names are inconsistent.</p> | <p>Set Element name mismatch on the Diagnostics > Connectivity pane of the Configuration Parameters dialog box or set the parameter <code>BusObjectLabelMismatch</code> to error.</p> |
| <p>The diagnostic that detects when some blocks treat a signal as a mux/vector, while other blocks treat the signal as a bus, is set to none or warning. When the Simulink software automatically converts a muxed signal to a bus, it is possible for an unintended operation or unpredictable behavior to occur.</p> | <ul style="list-style-type: none"> • Set Mux blocks used to create bus signals on the Diagnostics > Connectivity pane of the Configuration Parameters dialog box to error, or set the parameter <code>StrictBusMsg</code> to <code>ErrorOnBusTreatedAsVector</code>. • Set “Bus signal treated as vector” on the Diagnostics > Connectivity pane of the Configuration Parameters dialog box to error, or the parameter <code>StrictBusMsg</code> to <code>ErrorOnBusTreatedAsVector</code>. <p>You can use the Model Advisor or the <code>slreplace_mux</code> utility function to replace all Mux block used as bus creators with a Bus Creator block.</p> |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to bus connectivity and that can impact safety.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “Diagnostics Pane: Connectivity” in the Simulink graphical user interface documentation
- `Simulink.Bus` in the Simulink reference documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0307: Configuration Parameters > Diagnostics > Connectivity > Buses”

Check safety-related diagnostic settings that apply to function-call connectivity

Check model configuration for diagnostic settings that apply to function-call connectivity and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to function-call connectivity are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| The diagnostic that detects incorrect use of a function-call subsystem is set to <code>none</code> or <code>warning</code> . If this condition is undetected, incorrect code might be generated. | Set Invalid function-call connection on the Diagnostics > Connectivity pane of the Configuration Parameters dialog box or set the parameter <code>InvalidFcnCallConMsg</code> to <code>error</code> . |
| The diagnostic that specifies whether the Simulink software has to compute inputs of a function-call subsystem directly or indirectly while executing the subsystem is set to <code>Use local settings</code> or <code>Disable all</code> . This diagnostic detects unpredictable data coupling between a function-call subsystem | Set Context-dependent inputs on the Diagnostics > Connectivity pane of the Configuration Parameters dialog box or set the parameter <code>FcnCallInpInsideContextMsg</code> to <code>Enable all</code> . |

| Condition | Recommended Action |
|--|--------------------|
| and the inputs of the subsystem in the generated code. | |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to function-call connectivity and that can impact safety.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “Diagnostics Pane: Connectivity” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0308: Configuration Parameters > Diagnostics > Connectivity > Function calls”

Check safety-related diagnostic settings for compatibility

Check model configuration for diagnostic settings that affect compatibility and that might impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to compatibility are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| 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 of the Configuration Parameters dialog box or set the parameter <code>SFcnCompatibilityMsg</code> to error . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that affect compatibility and that might impact safety.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- MISRA-C:2004, Rule 9.1
- “Manage Errors and Warnings” in the Simulink documentation
- “Diagnostics Pane: Compatibility” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0301: Configuration Parameters > Diagnostics > Compatibility”

Check safety-related diagnostic settings for model initialization

In the model configuration, check diagnostic settings that affect model initialization and might impact safety.

Description

This check verifies that model diagnostic configuration parameters for initialization are optimally set to generate code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <p>In the Configuration Parameters dialog box, on the Diagnostics > Data Validity pane, 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</p> | <p>Do one of the following:</p> <ul style="list-style-type: none"> • In the Configuration Parameters dialog box, on the Diagnostics > Data Validity pane, set “Underspecified initialization detection” to Simplified. • In the Configuration Parameters dialog box, on the Diagnostics > Data Validity pane, set “Underspecified initialization |

| Condition | Recommended Action |
|--|---|
| <p>executed subsystem, in which a block with a specified initial condition drives an Outport block with an undefined initial condition. A conditionally executed subsystem could have an output that is not initialized. If undetected, this condition can produce behavior that is nondeterministic.</p> | <p>detection” to Classic and select “Check undefined subsystem initial output”.</p> <ul style="list-style-type: none"> Set the parameter <code>CheckSSInitialOutputMsg</code> to on. |
| <p>In the Configuration Parameters dialog box, on the Diagnostics > Data Validity pane, the “Underspecified initialization detection” diagnostic is set to Classic, ensuring compatibility with previous releases of Simulink. The “Check preactivation output of execution context” diagnostic is cleared. This diagnostic detects potential initial output differences from earlier releases. A conditionally executed subsystem could have an output that is not initialized. If undetected, this condition can produce behavior that is nondeterministic.</p> | <p>Do one of the following:</p> <ul style="list-style-type: none"> In the Configuration Parameters dialog box, on the Diagnostics > Data Validity pane, set “Underspecified initialization detection” to Simplified. In the Configuration Parameters dialog box, on the Diagnostics > Data Validity pane, set “Underspecified initialization detection” to Classic and select “Check preactivation output of execution context”. Set the parameter <code>CheckExecutionContextPreStartOutputMsg</code> to on. |
| <p>In the Configuration Parameters dialog box, on the Diagnostics > Data Validity pane, 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.</p> | <p>Do one of the following:</p> <ul style="list-style-type: none"> In the Configuration Parameters dialog box, on the Diagnostics > Data Validity pane, set “Underspecified initialization detection” to Simplified. In the Configuration Parameters dialog box, on the Diagnostics > Data Validity pane, set “Underspecified initialization detection” to Classic and select “Check runtime output of execution context”. Set the parameter <code>CheckExecutionContextRuntimeOutputMsg</code> 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.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- MISRA-C:2004, Rule 9.1
- “Manage Errors and Warnings” in the Simulink documentation
- “Diagnostics Pane: Data Validity” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0304: Configuration Parameters > Diagnostics > Data Validity > Model Initialization”

Check safety-related diagnostic settings for model referencing

Check model configuration for diagnostic settings that apply to model referencing and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to model referencing are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| 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 | Set Model block version mismatch on the Diagnostics > Model Referencing pane of the Configuration Parameters dialog box or set the parameter |

| Condition | Recommended Action |
|--|--|
| <p>error or warning. The detection occurs during load and update operations. When you get the latest version of the referenced model from the software configuration management system, rather than an older version that was used in a previous simulation, if this diagnostic is set to error, the simulation is aborted. If the diagnostic is set to warning, a warning message is issued. To resolve the issue, the user must resave the model being simulated, which may not be the desired action. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>ModelReferenceVersionMismatchMessage to none.</p> |
| <p>The diagnostic that detects port and parameter mismatches during model loading and updating is set to none or warning. If undetected, such mismatches can lead to incorrect simulation results because the parent and referenced models have different interfaces. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set Port and parameter mismatch on the Diagnostics > Model Referencing pane of the Configuration Parameters dialog box or set the parameter ModelReferenceIOMismatchMessage to error.</p> |
| <p>The Model configuration mismatch diagnostic is set to none or error. This diagnostic checks whether the configuration parameters of a model referenced by the current model match the current model's configuration parameters or are inappropriate for a referenced model. Some diagnostics for referenced models are not supported in simulation mode. Setting this diagnostic to error can prevent simulations from running. Some differences in configurations can lead to incorrect simulation results and mismatches between simulation and target code generation. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set Model configuration mismatch on the Diagnostics > Model Referencing pane of the Configuration Parameters dialog box or set the parameter ModelReferenceCSMismatchMessage to warning.</p> |

| Condition | Recommended Action |
|--|---|
| <p>The diagnostic that detects invalid internal connections to the current model's root-level Inport and Outport blocks is set to none or warning. When this condition is detected, the Simulink software might automatically insert hidden blocks into the model to fix the condition. The hidden blocks can result in generated code without traceable requirements. Setting the diagnostic to error forces model developers to fix the referenced models manually. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set Invalid root Inport/Outport block connection on the Diagnostics > Model Referencing pane of the Configuration Parameters dialog box or set the parameter <code>ModelReferenceIOMessage</code> to error.</p> |
| <p>The diagnostic that detects whether To Workspace or Scope blocks are logging data in a referenced model is set to none or 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.)</p> | <p>Set Unsupported data logging on the Diagnostics > Model Referencing pane of the Configuration Parameters dialog box or set the parameter <code>ModelReferenceDataLoggingMessage</code> to error. To log data, remove the blocks and log the referenced model signals. For more information, see “Logging Referenced Model Signals”.</p> |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to model referencing and that can impact safety.

See Also

- “Manage Errors and Warnings” in the Simulink documentation
- “Diagnostics Pane: Model Referencing” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “Logging Referenced Model Signals” in the Simulink documentation
- “hisl_0310: Configuration Parameters > Diagnostics > Model Referencing”

Check safety-related model referencing settings

Check model configuration for model referencing settings that can impact safety.

Description

This check verifies that model configuration parameters for model referencing are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>The referenced model is configured such that its target is rebuilt whenever you update, simulate, or generate code for the model, or if the Simulink software detects changes in known dependencies. These configuration settings can result in unnecessary regeneration of the code, resulting in changing only the date of the file and slowing down the build process when using model references. (See DO-331, Section MB.6.3.1.b – High-level requirements are accurate and consistent and DO-331, Section MB.6.3.2.b – Low-level requirements are accurate and consistent.)</p> | <p>Set “Rebuild” on the Model Referencing pane of the Configuration Parameters dialog box or set the parameter <code>UpdateModelReferenceTargets</code> to <code>Never</code> or <code>If any changes detected</code>.</p> |
| <p>The diagnostic that detects whether a target needs to be rebuilt is set to <code>None</code> or <code>Warn</code> 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 <code>Never</code>. (See DO-331, Section MB.6.3.1.b – High-level requirements are accurate and consistent and DO-331, Section MB.6.3.2.b – Low-level requirements are accurate and consistent.)</p> | <p>Set “Never rebuild diagnostic” on the Model Referencing pane of the Configuration Parameters dialog box or set the parameter <code>CheckModelReferenceTargetMessage</code> to <code>error</code>.</p> |

| Condition | Recommended Action |
|---|--|
| <p>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.)</p> | <p>Set “Pass fixed-size scalar root inputs by value for code generation” on the Model Referencing pane of the Configuration Parameters dialog box or set the parameter <code>ModelReferencePassRootInputsByReference</code> to off.</p> |
| <p>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.)</p> | <p>Set “Minimize algebraic loop occurrences” on the Model Referencing pane of the Configuration Parameters dialog box or set the parameter <code>ModelReferenceMinAlgLoopOccurrences</code> to off.</p> |

Action Results

Clicking **Modify Settings** configures model referencing settings that can impact safety.

Subchecks depend on the results of the subchecks noted with **D** in the results table in the Model Advisor window.

See Also

- “Analyze Model Dependencies” in the Simulink documentation
- “Model Referencing Pane” in the Simulink graphical user interface documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

Check safety-related code generation settings

Check model configuration for code generation settings that can impact safety.

Description

This check verifies that model configuration parameters for code generation are set optimally for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The option to include comments in the generated code is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.) | Select Include comments on the Code Generation > Comments pane of the Configuration Parameters dialog box or set the parameter <code>GenerateComments</code> to on. |
| The option to include comments that describe the code for blocks is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.) | Select Simulink block / Stateflow object comments on the Code Generation > Comments pane of the Configuration Parameters dialog box or set the parameter <code>SimulinkBlockComments</code> to on. |
| The option to include comments that describe the code for blocks eliminated from a model is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.) | Select Show eliminated blocks on the Code Generation > Comments pane of the Configuration Parameters dialog box or set the parameter <code>ShowEliminatedStatement</code> to on. |
| The option to include the names of parameter variables and source blocks as comments in the model parameter structure declaration in <code>model_prm.h</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 Verbose comments for SimulinkGlobal storage class on the Code Generation > Comments pane of the Configuration Parameters dialog box or set the parameter <code>ForceParamTrailComments</code> to on. |
| 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 > Comments pane of the Configuration Parameters dialog box or set the parameter <code>ReqsInCode</code> to on. |
| The option to generate nonfinite data and operations is selected. Support for nonfinite numbers is inappropriate for real-time | Clear Support: non-finite numbers on the Code Generation > Interface pane of the Configuration |

| Condition | Recommended Action |
|--|---|
| <p>embedded systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Parameters dialog box or set the parameter <code>SupportNonFinite</code> to off.</p> |
| <p>The option to generate and maintain integer counters for absolute and elapsed time is selected. Support for absolute time is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Clear Support: absolute time on the Code Generation > Interface pane of the Configuration Parameters dialog box or set the parameter <code>SupportAbsoluteTime</code> to off.</p> |
| <p>The option to generate code for blocks that use continuous time is selected. Support for continuous time is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Clear Support: continuous time on the Code Generation > Interface pane of the Configuration Parameters dialog box or set the parameter <code>SupportContinuousTime</code> to off.</p> |
| <p>The option to generate code for noninlined S-functions is selected. This option requires support of nonfinite numbers, which is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Clear Support: non-inlined S-functions on the Code Generation > Interface pane of the Configuration Parameters dialog box or set the parameter <code>SupportNonInlinedSFcns</code> to off.</p> |

| Condition | Recommended Action |
|---|---|
| <p>The option to generate model function calls compatible with the main program module of the pre-R2012a GRT target is selected. This option is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Clear Classic call interface on the Code Generation > Interface pane of the Configuration Parameters dialog box or set the parameter <code>GRTInterface</code> to off.</p> |
| <p>The option to generate the <code>model_update</code> function is cleared. Having a single call to the output and update functions simplifies the interface to the real-time operating system (RTOS) and simplifies verification of the generated code. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Select Single output/update function on the Code Generation > Interface pane of the Configuration Parameters dialog box or set the parameter <code>CombineOutputUpdateFcns</code> to on.</p> |
| <p>The option to generate the <code>model_terminate</code> function is selected. This function deallocates dynamic memory, which is unsuitable for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Clear Terminate function required on the Code Generation > Interface pane of the Configuration Parameters dialog box or set the parameter <code>IncludeMdlTerminateFcn</code> to off.</p> |
| <p>The option to log or monitor error status is cleared. If you do not select this option, the Simulink Coder product generates extra code that might not be reachable for testing. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Select Suppress error status in real-time model data structure on the Code Generation > Interface pane of the Configuration Parameters dialog box or set the parameter <code>SuppressErrorStatus</code> to on.</p> |

| Condition | Recommended Action |
|--|--|
| <p>MAT-file logging is selected. This option adds extra code for logging test points to a MAT-file, which is not supported by embedded targets. Use this option only in test harnesses. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Clear MAT-file logging on the Code Generation > Interface pane of the Configuration Parameters dialog box or set the parameter <code>MatFileLogging</code> to <code>off</code>.</p> |
| <p>The option that specifies the style for parenthesis usage is set to Minimum (Rely on C/C++ operators precedence) or to Nominal (Optimize for readability). For safety-related applications, explicitly specify precedence with parentheses. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer, DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer, and MISRA-C:2004, Rule 12.1.)</p> | <p>Set Parenthesis level on the Code Generation > Code pane of the Configuration Parameters dialog box or set the parameter <code>ParenthesesLevel</code> to Maximum (Specify precedence with parentheses).</p> |
| <p>The option that specifies whether to preserve operand order is cleared. This option increases the traceability of the generated code. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)</p> | <p>Select Preserve operand order in expression on the Code Generation > Code pane of the Configuration Parameters dialog box or set the parameter <code>PreserveExpressionOrder</code> to <code>on</code>.</p> |
| <p>The option that specifies whether to preserve empty primary condition expressions in <code>if</code> statements is cleared. This option increases the traceability of the generated code. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)</p> | <p>Select Preserve condition expression in if statement on the Code Generation > Code pane of the Configuration Parameters dialog box or set the parameter <code>PreserveIfCondition</code> to <code>on</code>.</p> |

| Condition | Recommended Action |
|---|---|
| The option that specifies whether to generate preprocessor conditional directives is set to generate code for nonactive variants. This might result in generating code that does not trace to the active variant of a variant model block or a variant subsystem. (See DO-331 Section MB.6.3.4.e — Source code is traceable to low-level requirements.) | Set “ Generate preprocessor conditionals ” on the Code Generation > Interface pane of the Configuration Parameters dialog box to Disable All . |
| 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 of 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.

See Also

- “Code Generation Pane: Comments” “Code Generation Pane: Comments” in the Simulink Coder reference documentation
- “Code Generation Pane: Symbols” in the Simulink Coder reference documentation
- “Code Generation Pane: Interface” in the Simulink Coder reference documentation
- “Code Generation Pane: Code Style” in the Embedded Coder reference documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

Check safety-related diagnostic settings for saving

Check model configuration for diagnostic settings that apply to saving model files

Description

This check verifies that model configuration parameters are set optimally for saving a model for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The diagnostic that detects whether a model contains disabled library links before the model is saved is set to none or warning . If this condition is undetected, incorrect code might be generated. | Set Block diagram contains disabled library links on the Diagnostics > Saving pane of the Configuration Parameters dialog box or set the parameter <code>SaveWithDisabledLinkMsg</code> to error . |
| The diagnostic that detects whether a model contains library links that are using parameters not in a mask before the model is saved is set to none or warning . If this condition is undetected, incorrect code might be generated. | Set Block diagram contains parameterized library links on the Diagnostics > Saving pane of the Configuration Parameters dialog box or set the parameter <code>SaveWithParameterizedLinkMsg</code> to error . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to saving a model file.

See Also

- DO-331, Section MB.6.3.3.b - Software architecture is consistent
- “Disable Links to Library Blocks” in the Simulink documentation
- “Identify disabled library links” in the Simulink documentation
- “Save a Model ” in the Simulink documentation
- “Model Parameters” in the Simulink documentation
- “Diagnostics Pane: Saving” in the Simulink documentation

Check for blocks that do not link to requirements

Check whether Simulink blocks and Stateflow objects link to a requirements document.

Description

This check verifies whether Simulink blocks and Stateflow objects link to a document containing engineering requirements for traceability.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Blocks do not link to a requirements document. | Link to requirements document. See “Link to Requirements Document Using Selection-Based Linking”. |

Capabilities and Limitations

You can:

- Run this check on your library models. When you run this check, the Model Advisor does not follow library links or look under masks.
- Exclude blocks and charts from this check.

Tip

Run this check from the top model or subsystem that you want to check.

See Also

- DO-331, Section MB.6.3.1.f - High-level requirements trace to system requirements
- DO-331, Section MB.6.3.2.f - Low-level requirements trace to high-level requirements
- “Requirements Traceability”

Check usage of Math blocks

Check whether math operators require nonfinite number support.

Description

This check verifies that Math Function blocks do not use math operations that need nonfinite number support with real-time embedded targets.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Math Function blocks using <code>log</code> (natural logarithm), <code>log10</code> (base 10 logarithm), and <code>rem</code> (Remainder) operators that require nonfinite number support. | <p>When using the Math Function block with a <code>log</code> or <code>log10</code> function, you must protect the input to the block in the model such that it is not less than or equal to zero. Otherwise, the output can produce a NaN or <code>-Inf</code> and result in a run-time error in the generated code.</p> <p>When using the Math Function block with a <code>rem</code> function, you must protect the second input to the block such that it is not equal to zero. Otherwise the output can produce a <code>Inf</code> or <code>-Inf</code> and result in a run-time error in the generated code.</p> |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

Tips

With embedded systems, you must take care when using blocks that could produce nonfinite outputs such as NaN, `Inf` or `-Inf`. Your design must protect the inputs to these blocks in order to avoid run-time errors in the embedded system.

See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate

- MISRA-C:2004, Rule 21.1
- “Math Function” block in the Simulink documentation

Check state machine type of Stateflow charts

Identify whether Stateflow charts are all Mealy or all Moore charts.

Description

Compares the state machine type of all Stateflow charts to the type that you specify in the input parameters.

Available with Simulink Verification and Validation.

Input Parameters

Common

Check whether charts use the same state machine type, and are all Mealy or all Moore charts.

Mealy

Check whether all charts are Mealy charts.

Moore

Check whether all charts are Moore charts.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The input parameter is set to Common and charts in the model use either of the following: <ul style="list-style-type: none"> • 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 . |

| Condition | Recommended Action |
|---|---|
| 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

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- DO-331, Section MB.6.3.1.b - High-level requirements are accurate and consistent
- DO-331, Section MB.6.3.1.e - High-level requirements conform to standards
- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- DO-331, Section MB.6.3.2.e - Low-level requirements conform to standards
- DO-331, Section MB.6.3.3.b - Software architecture is consistent
- DO-331, Section MB.6.3.3.e - Software architecture conform to standards
- “hisf_0001: Mealy and Moore semantics”
- “Overview of Mealy and Moore Machines”
- “Chart Properties”
- “Chart Architecture”

Check Stateflow charts for ordering of states and transitions

Identify Stateflow charts that have **User specified state/transition execution order** cleared.

Description

Identify Stateflow charts that have **User specified state/transition execution order** cleared, and therefore do not use explicit ordering of parallel states and transitions.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Stateflow charts have 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

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

Action Results

Clicking **Modify** selects **User specified state/transition execution order** for the specified charts.

See Also

- DO-331, Section MB.6.3.3.b - Software architecture is consistent
- DO-331, Section MB.6.3.3.e - Software architecture conform to standards
- “hisf_0002: User-specified state/transition execution order”
“Transition Testing Order in Multilevel State Hierarchy” in the Stateflow documentation.
- “Execution Order for Parallel States” in the Stateflow documentation.
- “Chart Properties”
- “Chart Architecture”

Check Stateflow debugging options

Identify whether Stateflow debugging options are cleared.

Description

Identify whether the following debugging options are cleared, which might lead to unreachable code and indeterminate execution time:

- **Enable debugging/animation**
- **Detect wrap on overflow (with debugging)**
- **Transition Conflict**
- **Data Range**
- **Detect Cycles**

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| <p>Any of the following debugging options are cleared:</p> <ul style="list-style-type: none"> • Enable debugging/animation • Detect wrap on overflow (with debugging) • Transition Conflict • Data Range • Detect Cycles | <p>Select the debugging options.</p> <p>In the Configuration Parameters dialog box, select:</p> <ul style="list-style-type: none"> • Simulation Target > General > Enable debugging/animation • Simulation Target > General > Detect wrap on overflow (with debugging) <p>In the Stateflow Debugging dialog box, select:</p> <ul style="list-style-type: none"> • Transition Conflict • Data Range • Detect Cycles |

Capabilities and Limitations

You can exclude blocks and charts from this check.

Action Results

Clicking **Modify** selects the specified debugging options.

See Also

- DO-331, Section MB.6.3.1.b - High-level requirements are accurate and consistent

- DO-331, Section MB.6.3.1.e - High-level requirements conform to standards
- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- DO-331, Section MB.6.3.2.e - Low-level requirements conform to standards
- “hisf_0011: Stateflow debugging settings”
- “Chart Properties”
- “Chart Architecture”

Check usage of lookup table blocks

Check for lookup table blocks that do not generate out-of-range checking code.

Description

This check verifies that the following blocks generate code to protect against inputs that fall outside the range of valid breakpoint values:

- 1-D Lookup Table
- 2-D Lookup Table
- n-D Lookup Table
- Prelookup

This check also verifies that Interpolation Using Prelookup blocks generate code to protect against inputs that fall outside the range of valid index values.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The lookup table block does not generate out-of-range checking code. | <p>Change the setting on the block dialog box so that out-of-range checking code is generated.</p> <ul style="list-style-type: none"> • 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. |

| Condition | Recommended Action |
|-----------|---|
| | <ul style="list-style-type: none"> For the Interpolation Using Prelookup block, clear the check box for Remove protection against out-of-range index in generated code. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

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
- “n-D Lookup Table” block in the Simulink documentation
- “Prelookup” block in the Simulink documentation
- “Interpolation Using Prelookup” block in the Simulink documentation

Check MATLAB Code Analyzer messages

Check MATLAB Functions for `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs.

Description

Verifies `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs for:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>For MATLAB code in MATLAB Function blocks, either of the following:</p> <ul style="list-style-type: none"> • Code lines are not justified with a <code> %#ok</code> comment. • Codes lines justified with <code> %#ok</code> do not specify a message id. | <ul style="list-style-type: none"> • Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment. • Specify justified code lines with a message id. For example, <code> %#ok<NOPRT></code>. |
| <p>For MATLAB functions defined in Stateflow charts, either of the following:</p> <ul style="list-style-type: none"> • Code lines are not justified with a <code> %#ok</code> comment. • Codes lines justified with <code> %#ok</code> do not specify a message id. | <ul style="list-style-type: none"> • Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment. • Specify justified code lines with a message id. For example, <code> %#ok<NOPRT></code>. |
| <p>For called MATLAB functions:</p> <ul style="list-style-type: none"> • Code does not have the <code> %#codegen</code> directive. • Code lines are not justified with a <code> %#ok</code> comment. • Codes lines justified with <code> %#ok</code> do not specify a message id. | <ul style="list-style-type: none"> • Insert <code> %#codegen</code> directive in the MATLAB code. • Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment. • Specify justified code lines with a message id. For example, <code> %#ok<NOPRT></code>. |

Capabilities and Limitations

You can run this check on your library models.

See Also

- DO-331, Sections MB.6.3.1.b and MB.6.3.2.b - Accuracy and consistency

- “Check Code for Errors and Warnings”
- “himl_0004: MATLAB Code Analyzer recommendations for code generation”

Check MATLAB code for global variables

Check for global variables in MATLAB code.

Description

Verifies that global variables are not used in any of the following:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Global variables are used in one or more of the following: <ul style="list-style-type: none"> • 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

You can run this check on your library models.

See Also

- DO-331, Sections MB.6.3.3.b ‘Consistency’
- “himl_0005: Usage of global variables in MATLAB functions”

Check for inconsistent vector indexing methods

Identify blocks with inconsistent indexing method.

Description

Using inconsistent block indexing methods can result in modeling errors. You should use a consistent vector indexing method for all blocks. This check identifies blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified. | Modify the model to use a single consistent indexing method. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “hisl_0021: Consistent vector indexing method”

Check for MATLAB Function block interfaces with inherited properties

Identify MATLAB Function blocks that have inputs, outputs or parameters with inherited complexity or data type properties.

Description

The check identifies MATLAB Function blocks with inherited complexity or data type properties. A results table provides links to MATLAB Function blocks that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>MATLAB Function blocks have inherited interfaces.</p> | <p>Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Function block identified in the results.</p> <p>If applicable, using the “MATLAB Function Block Editor”, make the following modifications in the “Ports and Data Manager”:</p> <ul style="list-style-type: none"> • Change Complexity from Inherited to On or Off. • Change Type from Inherit: Same as Simulink to an explicit type. <p>In the results table, Compiled Value provides suggestions for the actual values after the model compiles. If a MATLAB Function block is defined within a library, explicitly define the interface in the library rather than in the referencing model. If your model has multiple instances of MATLAB Function blocks defined in a library block, and the instances have different interface properties, consider using multiple library blocks.</p> |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “himl_0002: Strong data typing at MATLAB function boundaries”

Check MATLAB Function block metrics

Display complexity and code metrics for MATLAB Function blocks and external MATLAB functions. Report metric violations.

Description

This check provides complexity and code metrics for MATLAB Function blocks and external MATLAB functions. The check additionally reports metric violations.

A results table provides links to MATLAB Function blocks and external MATLAB functions that violate the complexity input parameters.

Available with Simulink Verification and Validation.

Input Parameters

Maximum effective lines of code per function

Provide the maximum effective lines of code per function. Effective lines do not include empty lines, comment lines, or lines with a function `end` keyword.

Minimum density of comments

Provide minimum density of comments. Density is ratio of comment lines to total lines of code.

Maximum cyclomatic complexity per function

Provide maximum cyclomatic complexity per function. Cyclomatic complexity is the number of linearly independent paths through the source code.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| MATLAB Function blocks or external MATLAB functions violate the complexity input parameters. | For the MATLAB Function block or external MATLAB function: <ul style="list-style-type: none"> • 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

You can exclude blocks and charts from this check.

See Also

- DO-331, Sections MB.6.3.1.e - High-level requirements conform to standards
- DO-331, Sections MB.6.3.2.e - Low-level requirements conform to standards
- “himl_0003: Limitation of MATLAB function complexity”

Check for blocks not recommended for C/C++ production code deployment

Identify blocks not supported by code generation or not recommended for C/C++ production code deployment.

Description

This check partially identifies model constructs that are not recommended for C/C++ production code generation as identified in the Simulink Block Support tables for Simulink Coder and Embedded Coder. If you are using blocks with support notes for code generation, review the information and follow the given advice.

Available with Simulink Verification and Validation and Embedded Coder.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains blocks that should not be used for production code deployment. | Consider replacing the blocks listed in the results. Click an element from the list of questionable items to locate condition. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent

- MISRA-C: 2004, Rule 5.6
- “Supported Products and Block Usage”

Check Stateflow charts for uniquely defined data objects

Identify Stateflow charts that include data objects that are not uniquely defined.

Description

This check searches your model for local data in Stateflow charts that is not uniquely defined.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The Stateflow chart contains a data object identifier defined in two or more scopes. | For the identified chart, do one of the following: <ul style="list-style-type: none"> • 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

You can run this check on your library models.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- MISRA-C: 2004, Rule 5.6
- “hisl_0061: Unique identifiers for clarity”

Check usage of Math Operations blocks

Identify usage of Math Operation blocks that might impact safety.

Description

This check inspects the usage of the following blocks:

- Abs
- Gain
- Math Function
 - Natural logarithm
 - Common (base 10) logarithm
 - Remainder after division
 - Reciprocal
- Assignment

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>The model or subsystem contains an Absolute Value block that is operating on one of the following:</p> <ul style="list-style-type: none"> • 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. | <p>If the identified Absolute Value block is operating on a boolean or unsigned data type, do one of the following:</p> <ul style="list-style-type: none"> • Change the input of the Absolute Value block to a signed input type. • Remove the Absolute Value block from the model. <p>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.</p> |
| <p>The model or subsystem contains Gain blocks with a of value 1 or an identity matrix.</p> | <p>If you are using Gain blocks as buffers, consider replacing them with Signal Conversion blocks.</p> |

| Condition | Recommended Action |
|--|--|
| 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. |
| 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. | When using the Assignment block with incompleted array initialization, set block parameter Action if any output element is not assigned to Error. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- DO-331 Section MB.6.3.1.d – High-level requirements are verifiable

- DO-331 Section MB.6.3.2.d – Low-level requirements are verifiable
- MISRA-C:2004, Rule 14.1
- MISRA-C:2004, Rule 21.1
- “hisl_0001: Usage of Abs block”
- “hisl_0002: Usage of Math Function blocks (rem and reciprocal)”
- “hisl_0004: Usage of Math Function blocks (natural logarithm and base 10 logarithm)”
- “hisl_0029: Usage of Assignment blocks”

Check usage of Signal Routing blocks

Identify usage of Signal Routing blocks that might impact safety.

Description

This check identifies model or subsystem Switch blocks that might generate code with inequality operations ($\sim=$) in expressions that contain a floating-point variable or constant.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| <p>The model or subsystem contains a Switch block that might generate code with inequality operations ($\sim=$) in expressions where at least one side of the expression contains a floating-point variable or constant. The Switch block might cause floating-point inequality comparisons in the generated code.</p> | <p>For the identified block, do one of the following:</p> <ul style="list-style-type: none"> • 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

You can exclude blocks and charts from this check.

See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate

- MISRA-C:2004, Rule 13.3

Check usage of Logic and Bit Operations blocks

Identify usage of Logical Operator and Bit Operations blocks that might impact safety.

Description

This check inspects the usage of:

- Blocks that compute relational operators, including Relational Operator, Compare To Constant, Compare To Zero, and Detect Change blocks
- Logical Operator blocks

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains a block computing a relational operator that is operating on different data types. The condition can lead to unpredictable results in the generated code. | 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 <code>boolean</code> . |
| The model or subsystem contains a block computing a relational operator that uses the <code>==</code> or <code>~=</code> operator to compare floating-point signals. The use of these operators on floating-point signals is unreliable and unpredictable because of floating-point precision issues. These operators can lead to unpredictable results in the generated code. | For the identified block, do one of the following: <ul style="list-style-type: none"> • Change the signal data type. • Rework the model to eliminate using <code>==</code> or <code>~=</code> operators on floating-point signals. |

| Condition | Recommended Action |
|---|---|
| <p>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.</p> | <ul style="list-style-type: none"> • 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 Optimization pane, consider selecting the Implement logic signals as boolean data (vs. double). |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- MISRA-C:2004, Rule 13.3
- “hisl_0016: Usage of blocks that compute relational operators”
- “hisl_0017: Usage of blocks that compute relational operators (2)”
- “hisl_0018: Usage of Logical Operator block”

Check usage of Ports and Subsystems blocks

Identify usage of Ports and Subsystems blocks that might impact safety.

Description

This check inspects the usage of:

- For Iterator blocks
- While Iterator blocks
- If blocks
- Switch Case blocks

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <p>The model or subsystem contains a For Iterator block that has variable iterations. This condition can lead to unpredictable execution times or infinite loops in the generated code.</p> | <p>For the identified For Iterator blocks, do one of the following:</p> <ul style="list-style-type: none"> • 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. |
| <p>The model or subsystem contains a While Iterator block that has unlimited iterations. This condition can lead to infinite loops in the generated code.</p> | <p>For the identified While Iterator blocks:</p> <ul style="list-style-type: none"> • Set the Maximum number of iterations (-1 for unlimited) parameter to a positive integer value. • Consider selecting the Show iteration number port check box and observe the iteration value during simulation. |
| <p>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.</p> | <p>Modify the expressions in the If block to avoid floating-point equality or inequality comparisons in generated code.</p> |
| <p>The model or subsystem contains an If block using Elseif expressions without an Else condition.</p> | <p>In the If block Block Parameters dialog box, select Show else condition. Connect the resulting Else output port to an If Action Subsystem block.</p> |
| <p>The model or subsystem contains an If block with output ports that do not connect to If Action Subsystem blocks.</p> | <p>Verify that output ports of the If block connect to If Action Subsystem blocks.</p> |

| Condition | Recommended Action |
|--|--|
| 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. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- DO-331, Section MB.6.3.3.b—Software architecture is consistent
- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- DO-331, Section MB.6.3.1.e – High-level requirements conform to standards
- DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards
- MISRA-C:2004, Rule 13.6
- MISRA-C:2004, Rule 14.10
- MISRA-C:2004, Rule 15.3
- MISRA-C:2004, Rule 21.1
- “hisl_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

Display model version information in your report.

Description

This check displays the following information for the current model:

- Version number
- Author
- Date
- Model checksum

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Could not retrieve model version and checksum information. | This summary is provided for your information. No action is required. |

See Also

- “Reports for Code Generation” in the Simulink Coder documentation
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

IEC 61508, ISO 26262, and EN 50128 Checks

In this section...

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- “Display model metrics and complexity report” on page 3-67
- “Check for unconnected objects” on page 3-68
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- “Check usage of Stateflow constructs” on page 3-78
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IEC 61508, ISO 26262, and EN 50128 Checks

IEC 61508, ISO 26262, and EN 50128 checks facilitate designing and troubleshooting models, subsystems, and the corresponding generated code for applications to comply with IEC 61508-3, ISO 26262-6, or EN 50128.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the IEC 61508, ISO 26262, or EN 50128 checks.

Tips

If your model uses model referencing, run the IEC 61508, ISO 26262, or EN 50128 checks on all referenced models before running them on the top-level model.

See Also

- IEC 61508-3 Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements
- ISO 26262-6 Road vehicles - Functional safety - Part 6: Product development: Software level
- EN 50128 Railway applications - Communications, signalling and processing systems - Software for railway control and protection systems
- Embedded Coder documentation:
 - “IEC 61508 Standard”
 - “ISO 26262 Standard”
 - “EN 50128 Standard”

Display model metrics and complexity report

Display number of elements and name, level, and depth of subsystems for the model or subsystem.

Description

The IEC 61508, ISO 26262, and EN 50128 standards recommend the usage of size and complexity metrics to assess the software under development. This check provides metrics information for the model. The provided information can be used to inspect whether the size or complexity of the model or subsystem exceeds given limits. The check displays:

- A block count for each Simulink block type contained in the given model.
- The maximum subsystem depth of the given model.
- A count of Stateflow constructs in the given model (if applicable).

- Name, level, and depth of the subsystems contained in the given model (if applicable).

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|-----------|---|
| N/A | This summary is provided for your information. No action is required. |

Capabilities and Limitations

You can run this check on your library models.

See Also

- IEC 61508-3, Table A.9 (5) - Software complexity metrics
- ISO 26262-6, Table 1 (1a) - Enforcement of low complexity, Table 4 (1a) - Hierarchical structure of software components, Table 4 (1b) - Restricted size of software components, and Table 4 (1c) - Restricted size of interfaces
- EN 50128, Table A.12 (8) - Limited size and complexity of Functions, Subroutines and Methods and (9) Limited number of subroutine parameters
- `sldiagnostics` in the Simulink documentation
- “Cyclomatic Complexity” in the Simulink Verification and Validation documentation

Check for unconnected objects

Identify unconnected lines, input ports, and output ports in the model.

Description

Unconnected objects are likely to cause problems propagating signal attributes such as data, type, sample time, and dimensions.

Ports connected to Ground or Terminator blocks pass this check.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| There are unconnected lines, input ports, or output ports in the model or subsystem. | <ul style="list-style-type: none"> • 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

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128, Table A.4 (11) - Language Subset
- “Signal Basics”

Check for root Inports with missing properties

Identify root model Inport blocks with missing or inherited sample times, data types or port dimensions.

Description

Using root model Inport blocks that do not have defined sample time, data types or port dimensions can lead to undesired simulation results. Simulink back-propagates dimensions, sample times, and data types from downstream blocks unless you explicitly assign these values. 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

You can exclude blocks and charts from this check.

Tips

The following configuration passes this check:

- Inport blocks with inherited sample times in conjunction with the **Periodic sample time constraint** menu set to **Ensure sample time independent**

See Also

- IEC 61508-3, Table B.9 (5) - Fully defined interface
- ISO 26262-4, Table 2 (2) - Precisely defined interfaces
- ISO 26262-6, Table 1 (1f) - Use of unambiguous graphical representation

- EN 50128, Table A.3 (19) - Fully Defined Interface
- “Data Types” in the Simulink documentation
- “Determine Output Signal Dimensions” in the Simulink documentation
- “Specify Sample Time” in the Simulink documentation
- “hisl_0024: Inport interface definition”
- “hisl_0025: Design min/max specification of input interfaces”
- “hisl_0026: Design min/max specification of output interfaces”

Check for MATLAB Function block interfaces with inherited properties

Identify MATLAB Function blocks that have inputs, outputs or parameters with inherited complexity or data type properties.

Description

The check identifies MATLAB Function blocks with inherited complexity or data type properties. A results table provides links to MATLAB Function blocks that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| MATLAB Function blocks have inherited interfaces. | <p>Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Function block identified in the results.</p> <p>If applicable, using the “MATLAB Function Block Editor”, make the following modifications in the “Ports and Data Manager”:</p> <ul style="list-style-type: none"> • Change Complexity from Inherited to On or Off. • Change Type from Inherit: Same as Simulink to an explicit type. |

| Condition | Recommended Action |
|-----------|---|
| | <p>In the results table, Compiled Value provides suggestions for the actual values after the model compiles. If a MATLAB Function block is defined within a library, explicitly define the interface in the library rather than in the referencing model.</p> <p>If your model has multiple instances of MATLAB Function blocks defined in a library block, and the instances have different interface properties, consider using multiple library blocks.</p> |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table B.9 (5) - Fully defined interface
- ISO 26262-6, Table 1 (1f) - Use of unambiguous graphical representation
- EN 50128, Table A.1 (11) - Software Interface Specifications
- “himl_0002: Strong data typing at MATLAB function boundaries”

Check MATLAB Function block metrics

Display complexity and code metrics for MATLAB Function blocks and external MATLAB functions. Report metric violations.

Description

The IEC 61508, ISO 26262, and EN 50128 standards recommend the usage of size and complexity metrics to assess the software under development. This check provides complexity and code metrics for MATLAB Function blocks and external MATLAB functions. The check additionally reports metric violations.

A results table provides links to MATLAB Function blocks and external MATLAB functions that violate the complexity input parameters.

Available with Simulink Verification and Validation.

Input Parameters

Maximum effective lines of code per function

Provide the maximum effective lines of code per function. Effective lines do not include empty lines, comment lines, or lines with a function `end` keyword.

Minimum density of comments

Provide minimum density of comments. Density is ratio of comment lines to total lines of code.

Maximum cyclomatic complexity per function

Provide maximum cyclomatic complexity per function. Cyclomatic complexity is the number of linearly independent paths through the source code.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| MATLAB Function blocks or external MATLAB functions violate the complexity input parameters. | <p>For the MATLAB Function block or external MATLAB function:</p> <ul style="list-style-type: none"> • 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

You can exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table B.9 (5) - Fully defined interface
- ISO 26262-6, Table 1 (1f) - Use of unambiguous graphical representation

- EN 50128, Table A.1(11) - Software Interface Specifications
- “himl_0003: Limitation of MATLAB function complexity”

Check for root Inports with missing range definitions

Identify root level Inport blocks with missing or erroneous minimum or maximum range values.

Description

The check identifies root level Inport blocks with missing or erroneous minimum or maximum range values. 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. |

| Condition | Recommended Action |
|---|--|
| <p>No data type specified — Model contains Inport blocks or Simulink signal objects with inherited data types.</p> | <p>Specify one of the supported data types:</p> <ul style="list-style-type: none"> • Enum • Simulink.AliasType • Simulink.Bus • Simulink.NumericType • build-in |
| <p>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.</p> | <p>For the listed Simulink signal objects, in the property dialog, select signal property Signal name must resolve to Simulink signal object.</p> |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table B.9 (5) – Fully defined interface
- ISO 26262-6, Table 2 (2) – Precisely defined interfaces
- EN 50128, Table A.1(11) – Software Interface Specifications, Table A.3(19) – Fully Defined Interface
- “hisl_0025: Design min/max specification of input interfaces”

Check for root Outports with missing range definitions

Identify root level Outport blocks with missing or erroneous minimum or maximum range values.

Description

The check identifies root level Outport blocks with missing or erroneous minimum or maximum range values. 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 |
|--|--|
| <p>Missing range — Model contains Outport blocks with numeric data types that have missing range parameters (minimum and/or maximum).</p> | <p>For the listed Outport blocks and Simulink signal objects, specify scalar minimum and maximum parameters.</p> |
| <p>Missing range(s) for bus object — Bus objects defining the Outport blocks have leaf elements with missing ranges.</p> | <p>For the listed leaf elements, to specify the model interface range, provide scalar minimum and maximum parameters.</p> |
| <p>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.</p> | <p>To enable range checking, specify minimum and maximum signal values on the leaf elements of the bus objects defining the data type.</p> <p>To enable the use of minimum and maximum values with bus objects, set configuration parameter Diagnostics > Connectivity > Buses > Mux blocks used to create bus signals to error.</p> |
| <p>No bus data type specified — Model contains Outport block or Simulink signal objects with inherited bus data types.</p> | <p>For the Outport blocks and Simulink signal objects, specify one of the supported data types:</p> <ul style="list-style-type: none"> • Enum • Simulink.AliasType • Simulink.Bus • Simulink.NumericType • build-in |
| <p>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.</p> | <p>For the listed Simulink signal objects, in the property dialog, select signal property Signal name must resolve to Simulink signal object.</p> |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table B.9 (5) – Fully defined interface
- ISO 26262-6, Table 2 (2) - Precisely defined interfaces
- EN 50128, Table A.1(11) – Software Interface Specifications, Table A.3(19) – Fully Defined Interface
- “hisl_0026: Design min/max specification of output interfaces”

Check for blocks not recommended for C/C++ production code deployment

Identify blocks not supported by code generation or not recommended for C/C++ production code deployment.

Description

This check partially identifies model constructs that are not recommended for C/C++ production code generation as identified in the Simulink Block Support tables for Simulink Coder and Embedded Coder. If you are using blocks with support notes for code generation, review the information and follow the given advice.

Available with Simulink Verification and Validation and Embedded Coder.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains blocks that should not be used for production code deployment. | Consider replacing the blocks listed in the results. Click an element from the list of questionable items to locate condition. |

Capabilities and Limitations

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset

- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.4 (11) - Language Subset
- “Supported Products and Block Usage”

Check usage of Stateflow constructs

Identify usage of Stateflow constructs that might impact safety.

Description

This check identifies instances of Stateflow software being used in a way that can impact an application's safety, including:

- Use of strong data typing
- Port name mismatches
- Scope of data objects and events
- Formatting of state action statements
- Ordering of states and transitions
- Unreachable code
- Indeterminate execution time

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <p>A Stateflow chart is not configured for strong data typing on boundaries between a Simulink model and the Stateflow chart. See:</p> <ul style="list-style-type: none"> • “hisf_0009: Strong data typing (Simulink and Stateflow boundary)” • IEC 61508-3, Table A.3 (2) - Strongly typed programming language • ISO 26262-6, Table 1 (1c) - Enforcement of strong typing • EN 50128, Table A.4 (8) - Strongly Typed Programming Language | <p>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.</p> |

| Condition | Recommended Action |
|---|--|
| <ul style="list-style-type: none"> MISRA-C:2004, Rules 10.1, 10.2, 10.3, and 10.4 | |
| <p>Signals have names that differ from those of their corresponding Stateflow ports. See:</p> <ul style="list-style-type: none"> IEC 61508-3, Table A.3 (3) - Language subset ISO 26262-6, Table 1 (1b) - Use of language subsets EN 50128, Table A.4 (11) - Language Subset | <ul style="list-style-type: none"> 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. |
| <p>Local data is not defined in the Stateflow hierarchy at the chart level or below. See:</p> <ul style="list-style-type: none"> IEC 61508-3, Table A.3 (3) - Language subset ISO 26262-6, Table 1 (1b) - Use of language subsets EN 50128, Table A.4 (11) - Language Subset | <p>Define local data at the chart level or below.</p> |
| <p>A new line is missing from a state action after:</p> <ul style="list-style-type: none"> An entry (en), during (du), or exit (ex) statement The semicolon (;) at the end of an assignment statement <p>See:</p> <ul style="list-style-type: none"> IEC 61508-3, Table A.3 (3) - Language subset ISO 26262-6, Table 1 (1b) - Use of language subsets EN 50128, Table A.4 (11) - Language Subset | <p>Add missing new lines.</p> |

| Condition | Recommended Action |
|---|--|
| <p>Stateflow charts have User specified state/transition execution order cleared. See:</p> <ul style="list-style-type: none"> • “hisf_0002: User-specified state/transition execution order” • IEC 61508-3, Table A.3 (3) - Language subset • 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 | <p>For the specified charts, in the Chart Properties dialog box, select User specified state/transition execution order.</p> |
| <p>Any of the following debugging options are cleared:</p> <ul style="list-style-type: none"> • Enable debugging/animation • Detect wrap on overflow (with debugging) • Transition Conflict • Data Range • Detect Cycles <p>See:</p> <ul style="list-style-type: none"> • “hisf_0011: Stateflow debugging settings” • IEC 61508-3, Table A.7 (2) - Simulation/modeling • ISO 26262-6, Table 1 (1d) - Use of defensive implementation techniques • EN 50128, Table A.3 (1) - Defensive Programming, Table A.11 (13) Simulation | <p>Select the debugging options.</p> <p>In the Configuration Parameters dialog box, select:</p> <ul style="list-style-type: none"> • Simulation Target > General > Enable debugging/animation • Simulation Target > General > Detect wrap on overflow (with debugging) <p>In the Stateflow Debugging dialog box, select:</p> <ul style="list-style-type: none"> • Transition Conflict • Data Range • Detect Cycles |

| Condition | Recommended Action |
|--|--|
| <p>The Stateflow chart contains a data object identifier defined in two or more scopes. See:</p> <ul style="list-style-type: none"> • “hisl_0061: Unique identifiers for clarity” • IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (5) - Design and coding standards • ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1e) - Use of established design principles, 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 • MISRA-C:2004, Rule 5.6 | <p>For the identified chart, do one of the following:</p> <ul style="list-style-type: none"> • 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

You can exclude blocks and charts from this check.

See Also

See the following topics in the Stateflow documentation:

- “Strong Data Typing with Simulink I/O”
- “Property Fields”
- “How Events Work in Stateflow Charts”
- “Add Data”
- “Label States”
- “Chart Properties”
- “Chart Architecture”

Check state machine type of Stateflow charts

Identify whether Stateflow charts are all Mealy or all Moore charts.

Description

Compares the state machine type of all Stateflow charts to the type that you specify in the input parameters.

Available with Simulink Verification and Validation.

Input Parameters

Mealy or Moore

Check whether charts use the same state machine type, and are all Mealy or all Moore charts.

Mealy

Check whether all charts are Mealy charts.

Moore

Check whether all charts are Moore charts.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The input parameter is set to Mealy or Moore and charts in the model use either of the following: <ul style="list-style-type: none"> • 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

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table A.7 (2) - Simulation/modeling
- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.11 (3) - Simulation
- “hisf_0001: Mealy and Moore semantics”
- “Overview of Mealy and Moore Machines” in the Stateflow documentation.
- “Chart Properties”
- “Chart Architecture”

Check for model objects that do not link to requirements

Check whether Simulink blocks and Stateflow objects link to a requirements document.

Description

This check verifies whether Simulink blocks and Stateflow objects link to a document containing engineering requirements for traceability.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Blocks do not link to a requirements document. | Link to requirements document. See “Link to Requirements Document Using Selection-Based Linking”. |

Capabilities and Limitations

You can:

- Run this check on your library models. When you run this check, the Model Advisor does not follow library links or look under masks.
- Exclude blocks and charts from this check.

Tip

Run this check from the top model or subsystem that you want to check.

See Also

- IEC 61508-3, Table A.1 (1) - Computer-aided specification tools, Table A.2 (8) - Computer-aided specification tools, Table A.8 (1) - Impact analysis
- ISO 26262-6, Table 8 (1a) - Documentation of the software unit design in natural language
- EN 50128, Table A.3 (23) - Modeling supported by computer aided design and specification tools, Table A.10 (1) - Impact Analysis
- “Requirements Traceability”

Check for inconsistent vector indexing methods

Identify blocks with inconsistent indexing method.

Description

Using inconsistent block indexing methods can result in modeling errors. You should use a consistent vector indexing method for all blocks. This check identifies blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified. | Modify the model to use a single consistent indexing method. |

Capabilities and Limitations

You can:

- Run this check on your library models.

- Exclude blocks and charts from this check.

See Also

- IEC 61508–3, Table A.3 (3) - Language subset, Table A.4 (5) - Design and coding standards
- ISO 26262-6, Table 1 (b) - Use of language subsets, Table 1 (f) - Use of unambiguous graphical representation
- EN 50128, Table A.4 (11) - Language Subset, Table A.12 (1) - Coding Standard
- “hisl_0021: Consistent vector indexing method”

Check MATLAB Code Analyzer messages

Check MATLAB Functions for `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs.

Description

Verifies `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs for:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>For MATLAB code in MATLAB Function blocks, either of the following:</p> <ul style="list-style-type: none"> • Code lines are not justified with a <code>%#ok</code> comment. • Codes lines justified with <code>%#ok</code> do not specify a message id. | <ul style="list-style-type: none"> • Implement MATLAB Code Analyzer recommendations. • Justify not following MATLAB Code Analyzer recommendations with a <code>%#ok</code> comment. • Specify justified code lines with a message id. For example, <code>%#ok<NOPRT></code>. |

| Condition | Recommended Action |
|--|---|
| <p>For MATLAB functions defined in Stateflow charts, either of the following:</p> <ul style="list-style-type: none"> Code lines are not justified with a <code> %#ok</code> comment. Codes lines justified with <code> %#ok</code> do not specify a message id. | <ul style="list-style-type: none"> Implement MATLAB Code Analyzer recommendations. Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment. Specify justified code lines with a message id. For example, <code> %#ok<NOPRT></code>. |
| <p>For called MATLAB functions:</p> <ul style="list-style-type: none"> Code does not have the <code> %#codegen</code> directive. Code lines are not justified with a <code> %#ok</code> comment. Codes lines justified with <code> %#ok</code> do not specify a message id. | <ul style="list-style-type: none"> Insert <code> %#codegen</code> directive in the MATLAB code. Implement MATLAB Code Analyzer recommendations. Justify not following MATLAB Code Analyzer recommendations with a <code> %#ok</code> comment. Specify justified code lines with a message id. For example, <code> %#ok<NOPRT></code>. |

Capabilities and Limitations

You can run this check on your library models.

See Also

- IEC 61508-3, Table A.3 (3) – Language subset, IEC 61508-3, Table A.4 (3) – Defensive programming
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- “Check Code for Errors and Warnings”
- “himl_0004: MATLAB Code Analyzer recommendations for code generation”

Check MATLAB code for global variables

Check for global variables in MATLAB code.

Description

Verifies that global variables are not used in any of the following:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Global variables are used in one or more of the following: <ul style="list-style-type: none"> • 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

You can run this check on your library models.

See Also

- IEC 61508-3, Table A.3 (3) – Language subset
- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.4 (11) - Language Subset
- “himl_0005: Usage of global variables in MATLAB functions”

Check usage of Math Operations blocks

Identify usage of Math Operation blocks that might impact safety.

Description

This check inspects the usage of the following blocks:

- Abs
- Assignment
- Gain

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>The model or subsystem contains an Absolute Value block that is operating on one of the following:</p> <ul style="list-style-type: none"> • 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. | <p>If the identified Absolute Value block is operating on a boolean or unsigned data type, do one of the following:</p> <ul style="list-style-type: none"> • Change the input of the Absolute Value block to a signed input type. • Remove the Absolute Value block from the model. <p>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.</p> |
| <p>The model or subsystem contains Gain blocks with a of value 1 or an identity matrix.</p> | <p>If you are using Gain blocks as buffers, consider replacing them with Signal Conversion blocks.</p> |
| <p>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.</p> | <p>When using the Assignment block with incompleted array initialization, set block parameter Action if any output element is not assigned to Error.</p> |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table A.3 (3) – Language subset, IEC 61508-3, Table A.4 (3) – Defensive programming, Table B.8 (3) – Control Flow Analysis
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques, Table 7 (1f) - Control flow analysis
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming, Table A.19 (3) - Control Flow Analysis
- MISRA-C:2004, Rule 14.1
- MISRA-C:2004, Rule 21.1
- “hisl_0001: Usage of Abs block”
- “hisl_0029: Usage of Assignment blocks”

Check usage of Signal Routing blocks

Identify usage of Signal Routing blocks that might impact safety.

Description

This check identifies model or subsystem Switch blocks that might generate code with inequality operations (\approx) 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 (\approx) 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: <ul style="list-style-type: none"> • 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

You can exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table A.3 (3) – Language subset, Table A.4 (3) – Defensive programming
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- MISRA-C:2004, Rule 13.3

Check usage of Logic and Bit Operations blocks

Identify usage of Logical Operator and Bit Operations blocks that might impact safety.

Description

This check inspects the usage of:

- Blocks that compute relational operators, including Relational Operator, Compare To Constant, Compare To Zero, and Detect Change blocks
- Logical Operator blocks

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains a block computing a relational operator that is operating on different data types. The condition can lead to unpredictable results in the generated code. | On the Block Parameters > Signal Attributes pane, set the Output data type to <code>boolean</code> for the specified blocks. |
| The model or subsystem contains a block computing a relational operator that uses the <code>==</code> or <code>~=</code> operator to compare floating-point signals. The use of these operators on floating-point signals is unreliable and unpredictable because of floating-point precision issues. These operators can lead to unpredictable results in the generated code. | For the identified block, do one of the following: <ul style="list-style-type: none"> • Change the signal data type. • Rework the model to eliminate using <code>==</code> or <code>~=</code> 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. | <ul style="list-style-type: none"> • 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. • In the Configuration Parameters dialog box, on the Optimization pane, consider selecting the Implement logic signals as boolean data (vs. double). |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table A.3 (2) – Strongly typed programming language, Table A.3 (3) – Language subset, Table A.4 (3) - Defensive programming
- ISO 26262-6, Table 1 (1c) - Enforcement of strong typing, Table 1 (1b) - Use of language subsets
- EN 50128 - Table A.4 (8) - Strongly Typed Programming Language, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- MISRA-C:2004, Rule 13.3
- “hisl_0016: Usage of blocks that compute relational operators”
- “hisl_0017: Usage of blocks that compute relational operators (2)”
- “hisl_0018: Usage of Logical Operator block”

Check usage of Ports and Subsystems blocks

Identify usage of Ports and Subsystems blocks that might impact safety.

Description

This check inspects the usage of:

- For Iterator blocks
- While Iterator blocks
- If blocks
- Switch Case blocks

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <p>The model or subsystem contains a For Iterator block that has variable iterations. This condition can lead to unpredictable execution times or infinite loops in the generated code.</p> | <p>For the identified For Iterator blocks, do one of the following:</p> <ul style="list-style-type: none"> • Set the Iteration limit source parameter to <code>internal</code>. • If the Iteration limit source parameter must be <code>external</code>, 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. |
| <p>The model or subsystem contains a While Iterator block that has unlimited iterations. This condition can lead to infinite loops in the generated code.</p> | <p>For the identified While Iterator blocks:</p> <ul style="list-style-type: none"> • Set the Maximum number of iterations (-1 for unlimited) parameter to a positive integer value. • Consider selecting the Show iteration number port check box and observe the iteration value during simulation. |
| <p>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.</p> | <p>Modify the expressions in the If block to avoid floating-point equality or inequality comparisons in generated code.</p> |

| Condition | Recommended Action |
|--|--|
| 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. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (3) - Defensive programming
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128 - Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- MISRA-C:2004, Rule 13.6, Rule 14.10, Rule 15.3, Rule 21.1
- “hisl_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

Display model configuration and checksum information.

Description

This informer check displays the following information for the current model:

- Model version number
- Model author
- Date
- Model checksum

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Could not retrieve model version and checksum information. | This summary is provided for your information. No action is required. |

See Also

- IEC 61508-3, Table A.8 (5) – Software configuration management
- ISO 26262-8, Clause 7.4.2
- EN 50128, Table A.9 (5) - Software Configuration Management
- “How Simulink Helps You Manage Model Versions” in the Simulink documentation
- “Model Change Log” in the Simulink Report Generator™ documentation
- “Simulink.BlockDiagram.getChecksum” in the Simulink documentation
- “Simulink.SubSystem.getChecksum” in the Simulink documentation

MathWorks Automotive Advisory Board Checks

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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 Web site, which lists downloads for the latest version of *Control Algorithm Modeling Guidelines Using MATLAB, Simulink, and Stateflow*

Check font formatting

Check for difference in font and font sizes.

Description

With the exception of free text annotations within a model, text elements, such as block names, block annotations, and signal labels, must have the same font style and font size. Select a font style and font size that is legible and portable (convertible between platforms), such as Arial or Times New Roman 12 point.

Available with Simulink Verification and Validation.

Input Parameters

Font Name

Apply the specified font to all text elements. When you specify **Common** (default), the check identifies different fonts used in your model. Although you can specify

other fonts, the fonts available from the drop-down list are Arial, Courier New, Georgia, Times New Roman, Arial Black, and Verdana.

Font Size

Apply the specified font size to all text elements. When you specify **Common** (default), the check identifies different font sizes used in your model. Although you can specify other font sizes, the font sizes available from the drop-down list are 6, 8, 9, 10, 12, 14, 16.

Font Style

Apply the specified font style to all text elements. When you specify **Common** (default), the check identifies different font styles used in your model. The font styles available from the drop-down list are **normal**, **bold**, **italic**, and **bold italic**.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The fonts or font sizes for text elements in the model are not consistent or portable. | Specify values for the font parameters and click Modify all Fonts , or manually change the fonts and font sizes of text elements in the model such that they are consistent and portable. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

Action Results

Clicking **Modify all Fonts** changes the font and font size of all text elements in the model according to the values you specify in the input parameters.

For the input parameters, if you specify **Common**, clicking **Modify all Fonts** changes the font and font sizes of all text elements in the model to the most commonly used fonts, font sizes, or font styles.

See Also

MAAB guideline “db_0043: Simulink font and font size”

Check Transition orientations in flow charts

Check transition orientations in flow charts.

Description

The following rules apply to transitions in flow charts:

- Draw transition conditions horizontally.
- Draw transitions with a condition action vertically.

Loop constructs are exceptions to these rules.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--------------------|
| The model includes a transition with a condition that is not drawn horizontally or a transition action that is not drawn vertically. | Modify the model. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “db_0132: Transitions in flow charts”

Check for nondefault block attributes

Identify blocks that use nondefault block parameter values that are not displayed in the model diagram.

Description

Model diagrams should display block parameters that have values other than default values. One way of displaying this information is by using the **Block Annotation** tab in the Block Properties dialog box.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Block parameters that have values other than default values, and the values are not in the model display. | In the Block Properties dialog, use the Block Annotation tab to add block parameter annotations. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

Tip

If you use the `add_block` function with `'built-in/blocktype'` as a source block path name for Simulink built-in blocks, some default parameter values of some blocks are different from the defaults that you get if you added those blocks interactively using Simulink.

See Also

- MAAB guideline “db_0140: Display of basic block parameters”
- For a list of block parameter default values, see “Block-Specific Parameters” in the Simulink documentation.
- `add_block` in the Simulink documentation

Check signal line labels

Check the labeling on signal lines.

Description

You should use a label to identify:

- Signals originating from the following blocks (the block icon exception noted below applies to all blocks listed, except Inport, Bus Selector, Demux, and Selector):
 - Bus Selector block (tool forces labeling)
 - Chart block (Stateflow)
 - Constant block
 - Data Store Read block
 - Demux block
 - From block
 - Inport block
 - Selector block
 - Subsystem block

Block Icon Exception If a signal label is visible in the display of the icon for the originating block, you do not have to display a label for the connected signal unless the signal label is required elsewhere due to a rule for signal destinations.

- Signals connected to one of the following destination blocks (directly or indirectly with a basic block that performs an operation that is not transformative):
 - Bus Creator block
 - Chart block (Stateflow)
 - Data Store Write block
 - Goto block
 - Mux block
 - Outport block
 - Subsystem block
- Any signal of interest.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Signals coming from Bus Selector, Chart, Constant, Data Store Read, Demux, From, Inport, or Selector blocks are not labeled. | Double-click the line that represents the signal. After the text cursor appears, enter a name and click anywhere outside the label to exit label editing mode. |

Capabilities and Limitations

You can run this check on your library models.

See Also

- MAAB guideline “na_0008: Display of labels on signals”
- “Signal Labels” in the Simulink documentation

Check for propagated signal labels

Check for propagated labels on signal lines.

Description

You should propagate a signal label from its source rather than enter the signal label explicitly (manually) if the signal originates from:

- An Inport block in a nested subsystem. However, if the nested subsystem is a library subsystem, you can explicitly label the signal coming from the Inport block to accommodate reuse of the library block.
- A basic block that performs a nontransformative operation.
- A Subsystem or Stateflow Chart block. However, if the connection originates from the output of an instance of the library block, you can explicitly label the signal to accommodate reuse of the library block.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model includes signal labels that were entered explicitly, but should be propagated. | Use the open angle bracket (<) character to mark signal labels that should be propagated and remove the labels that were entered explicitly. |

Capabilities and Limitations

You can run this check on your library models.

See Also

- MAAB guideline “na_0009: Entry versus propagation of signal labels”
- “Signal Labels” in the Simulink documentation

Check default transition placement in Stateflow charts

Check default transition placement in Stateflow charts.

Description

In a Stateflow chart, you should connect the default transition at the top of the state and place the destination state of the default transition above other states in the hierarchy.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| The default transition for a Stateflow chart is not connected at the top of the state. | Move the default transition to the top of the Stateflow chart. |
| The destination state of a Stateflow chart's default transition is lower than other states in the same hierarchy. | Adjust the position of the default transition's destination state such that the state is above other states in the same hierarchy. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- MAAB guideline “jc_0531: Placement of the default transition”
- “Syntax for States and Transitions”

Check return value assignments of graphical functions in Stateflow charts

Identify graphical functions with multiple assignments of return values in Stateflow charts.

Description

The return value from a Stateflow graphical function must be set in only one place.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The return value from a Stateflow graphical function is assigned in multiple places. | Modify the specified graphical function so that its return value is set in one place. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- MAAB guideline “jc_0511: Setting the return value from a graphical function”
- “When to Use Reusable Functions in Charts” in the Stateflow documentation

Check entry formatting in State blocks in Stateflow charts

Identify missing line breaks between entry action (en), during action (du), and exit action (ex) entries in states. Identify missing line breaks after semicolons (;) in statements.

Description

Start a new line after the `entry`, `during`, and `exit` entries, and after the completion of a statement “;”.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--------------------------------------|
| An entry (en) is not on a new line. | Add a new line after the entry. |
| A during (du) is not on a new line. | Add a new line after the during. |
| An exit (ex) is not on a new line. | Add a new line after the exit. |
| Multiple statements found on one line. | Add a new line after each statement. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “jc_0501: Format of entries in a State block”

Check usage of return values from a graphical function in Stateflow charts

Identify calls to graphical functions in conditional expressions.

Description

Do not use the return value of a graphical function in a comparison operation.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Conditional expressions contain calls to graphical functions. | Assign return values of graphical functions to intermediate variables. Use these intermediate variables in the specified conditional expressions. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- MAAB guideline “jc_0521: Use of the return value from graphical functions”
- “When to Use Reusable Functions in Charts” in the Stateflow documentation
- “Reuse Logic Patterns Using Graphical Functions” in the Stateflow documentation

Check for pointers in Stateflow charts

Identify pointer operations on custom code variables.

Description

Pointers to custom code variables are not allowed.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Custom code variables use pointer operations. | Modify the specified chart to remove the dependency on pointer operations. |

Capabilities and Limitations

- This check applies only to Stateflow charts that use C as the action language.
- You can:
 - Run this check on your library models.
 - Exclude blocks and charts from this check.

See Also

MAAB guideline “jm_0011: Pointers in Stateflow”

Check for event broadcasts in Stateflow charts

Identify undirected event broadcasts that might cause recursion during simulation and generate inefficient code.

Description

Event broadcasts in Stateflow charts must be directed.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|----------------------------------|---|
| Event broadcasts are undirected. | Rearchitect the diagram to use directed event broadcasting. Use the send syntax or qualified event names to direct the event to a particular state. Use multiple send statements to direct an event to more than one state. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- MAAB guideline “jm_0012: Event broadcasts”
- “Broadcast Events to Synchronize States” in the Stateflow documentation

Check transition actions in Stateflow charts

Identify missing line breaks between transition actions.

Description

For readability, start each transition action on a new line.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Multiple transition actions are on a single line. | Verify that each transition action begins on a new line. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

- MAAB guideline “db_0151: State machine patterns for transition actions”
- “Syntax for States and Transitions”

Check for MATLAB expressions in Stateflow charts

Identify Stateflow objects that use MATLAB expressions that are not suitable for code generation.

Description

Do not use MATLAB functions, instructions, and operators in Stateflow objects.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Stateflow objects use MATLAB expressions. | Replace MATLAB expressions in Stateflow objects. |

Capabilities and Limitations

- This check applies only to Stateflow charts that use C as the action language.
- You can:
 - Run this check on your library models.
 - Exclude blocks and charts from this check.

See Also

- MAAB guideline “db_0127: MATLAB commands in Stateflow”
- “Access Built-In MATLAB Functions and Workspace Data” in the Stateflow documentation

Check for indexing in blocks

Check 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 |
|---|--|
| <ul style="list-style-type: none"> • Assignment block • For Iterator block • Find block • Multiport Switch block • Selector block | <ul style="list-style-type: none"> • Zero-based indexing ([0, 1, 2, ...]) • One-based indexing ([1, 2, 3,...]) |
| <ul style="list-style-type: none"> • Stateflow charts with C action language | Zero-based indexing ([0, 1, 2, ...]) |
| <ul style="list-style-type: none"> • 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

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

See MAAB guideline “db_0112: Indexing”

Check file names

Checks the names of all files residing in the same folder as the model

Description

A file name conforms to constraints.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The file name contains illegal characters. | Rename the file. Allowed characters are a–z, A–Z, 0–9, and underscore (_). |
| The file name starts with a number. | Rename the file. |

| Condition | Recommended Action |
|--|----------------------------|
| The file name starts with an underscore ("_"). | Rename the file. |
| The file name ends with an underscore ("_"). | Rename the file. |
| The file extension contains one (or more) underscores. | Change the file extension. |
| The file name has consecutive underscores. | Rename the file. |
| The file name contains more than one dot ("."). | Rename the file. |

Capabilities and Limitations

You can run this check on your library models.

See Also

MAAB guideline “ar_0001: Filenames”

Check folder names

Checks model directory and subdirectory names for invalid characters.

Description

A directory name conforms to constraints.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The directory name contains illegal characters. | Rename the directory. Allowed characters are a–z, A–Z, 0–9, and underscore (_). |
| The directory name starts with a number. | Rename the directory. |
| The directory name starts with an underscore ("_"). | Rename the directory. |

| Condition | Recommended Action |
|---|-----------------------|
| The directory name ends with an underscore ("_"). | Rename the directory. |
| The directory name has consecutive underscores. | Rename the directory. |

Capabilities and Limitations

You can run this check on your library models.

See Also

MAAB guideline “ar_0002: Directory names”

Check for prohibited blocks in discrete controllers

Check for prohibited blocks in discrete controllers.

Description

You cannot include continuous blocks in controller models.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Continuous blocks — Derivative, Integrator, State-Space, Transfer Fcn, Transfer Delay, Variable Time Delay, Variable Transport Delay, and Zero-Pole — are not permitted in models representing discrete controllers. | Replace continuous blocks with the equivalent blocks discretized in the s-domain by using the Discretizing library, as explained in “Discretize Blocks from the Simulink Model” in the Simulink documentation. |

Capabilities and Limitations

You can:

- Run this check on your library models.

- Exclude blocks and charts from this check.

See Also

MAAB guideline “jm_0001: Prohibited Simulink standard blocks inside controllers”

Check for prohibited sink blocks

Check for prohibited Simulink sink blocks.

Description

You must design controller models from discrete blocks. Sink blocks, such as the Scope block, are not allowed.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|------------------------------------|
| Sink blocks are not permitted in discrete controllers. | Remove sink blocks from the model. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “hd_0001: Prohibited Simulink sinks”

Check positioning and configuration of ports

Check whether the model contains ports with invalid position and configuration.

Description

In models, ports must comply with the following rules:

- Place Inport blocks on the left side of the diagram. Move the Inport block right only to prevent signal crossings.
- Place Outport blocks on the right side of the diagram. Move the Outport block left only to prevent signal crossings.
- Avoid using duplicate Inport blocks at the subsystem level if possible.
- Do not use duplicate Inport blocks at the root level.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Inport blocks are too far to the right and result in left-flowing signals. | Move the specified Inport blocks to the left. |
| Outport blocks are too far to the left and result in right-flowing signals. | Move the specified Output blocks to the right. |
| Ports do not have the default orientation. | Modify the model diagram such that signal lines for output ports enter the side of the block and signal lines for input ports exit the right side of the block. |
| Ports are duplicate Inport blocks. | <ul style="list-style-type: none"> • 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

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “db_0042: Port block in Simulink models”

Available with Simulink Verification and Validation.

Check for matching port and signal names

Check for mismatches between names of ports and corresponding signals.

Description

Use matching names for ports and their corresponding signals.

Available with Simulink Verification and Validation.

Prerequisite

Prerequisite MAAB guidelines for this check are:

- “db_0042: Port block in Simulink models”
- “na_0005: Port block name visibility in Simulink models”

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Ports have names that differ from their corresponding signals. | Change the port name or the signal name to match the name for the signal. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “jm_0010: Port block names in Simulink models”

Check whether block names appear below blocks

Check whether block names appear below blocks.

Description

If shown, the name of the block should appear below the block.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Blocks have names that do not appear below the blocks. | Set the name of the block to appear below the blocks. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “db_0142: Position of block names”

Check for mixing basic blocks and subsystems

Check for systems that mix primitive blocks and subsystems.

Description

You must design each level of a model with building blocks of the same type, for example, only subsystems or only primitive (basic) blocks. If you mask your subsystem and set MaskType to a non-empty string, the subsystem is seen as a basic block.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| A level in the model includes both subsystem blocks and primitive blocks. | Move nonvirtual blocks into the subsystem. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “db_0143: Similar block types on the model levels”

Check for unconnected ports and signal lines

Check whether model has unconnected input ports, output ports, or signal lines.

Description

Unconnected inputs should be connected to ground blocks. Unconnected outputs should be connected to terminator blocks.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Blocks have unconnected inputs or outputs. | Connect unconnected lines to blocks specified by the design or to Ground or Terminator blocks. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “db_0081: Unconnected signals, block inputs and block outputs”

Check position of Trigger and Enable blocks

Check the position of Trigger and Enable blocks.

Description

Locate blocks that define subsystems as conditional or iterative at the top of the subsystem diagram.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Trigger , Enable, and Action Port blocks are not centered in the upper third of the model diagram. | Move the Trigger, Enable, and Action Port blocks to the upper third of the model diagram. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “db_0146: Triggered, enabled, conditional Subsystems”

Check usage of tunable parameters in blocks

Check whether tunable parameters specify expressions, data type conversions, or indexing operations.

Description

To make a parameter tunable, you must enter the basic block without the use of MATLAB calculations or scripting. For example, omit:

- Expressions
- Data type conversions
- Selections of rows or columns

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Blocks have a tunable parameter that specifies an expression, data type conversion, or indexing operation. | In each case, move the calculation outside of the block, for example, by performing the calculation with a series of Simulink blocks, or precompute the value as a new variable. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “db_0110: Tunable parameters in basic blocks”

Check Stateflow data objects with local scope

Check whether Stateflow data objects with local scope are defined at the chart level or below.

Description

You must define local data of a Stateflow block on the chart level or below in the object hierarchy. You cannot define local variables on the machine level; however, parameters and constants are allowed at the machine level.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Local data is not defined in the Stateflow hierarchy at the chart level or below. | Define local data at the chart level or below. |

Capabilities and Limitations

You can run this check on your library models.

See Also

MAAB guideline “db_0125: Scope of internal signals and local auxiliary variables”

Check for Strong Data Typing with Simulink I/O

Check whether labeled Stateflow and Simulink input and output signals are strongly typed.

Description

Strong data typing between Stateflow and Simulink input and output signals is required.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| A Stateflow chart does not use strong data typing with Simulink. | Select the Use Strong Data Typing with Simulink I/O check box for the specified block. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “db_0122: Stateflow and Simulink interface signals and parameters”

Check usage of exclusive and default states in state machines

Check states in state machines.

Description

In state machines:

- There must be at least two exclusive states.
- A state cannot have only one substate.
- The initial state of a hierarchical level with exclusive states is clearly defined by a default transition.

Available with Simulink Verification and Validation.

Prerequisite

A prerequisite MAAB guideline for this check is “db_0149: 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, or add another exclusive (OR) state. |
| 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

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “db_0137: States in state machines”

Check Implement logic signals as Boolean data (vs. double)

Check the optimization parameter for Boolean data types.

Description

Optimization for Boolean data types is required

Available with Simulink Verification and Validation.

Prerequisite

A prerequisite MAAB guideline for this check is “na_0002: Appropriate implementation of fundamental logical and numerical operations”.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Configuration setting for 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 Optimization pane. |

See Also

MAAB guideline “jc_0011: Optimization parameters for Boolean data types”

Check model diagnostic parameters

Check the model diagnostics configuration parameter settings.

Description

You should enable the following diagnostics:

Algebraic loop

Minimize algebraic loop

Inf or NaN block output

Duplicate data store names
Unconnected block input ports
Unconnected block output ports
Unconnected line
Unspecified bus object at root Outputport 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 of the Configuration Parameters dialog box to error or warning . Otherwise, Simulink might attempt to automatically break the algebraic loops, which can impact the execution order of the blocks. |
| Minimize algebraic loop is set to none. | Set Minimize algebraic loop on the Diagnostics > Solver pane of 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 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 of 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 of the Configuration Parameters dialog box to error or warning . |

| Condition | Recommended Action |
|--|---|
| <p>Unconnected block input ports is set to none, which prevents code generation.</p> | <p>Set Unconnected block input ports on the Diagnostics > Data Validity > Signals pane of the Configuration Parameters dialog box to error or warning.</p> |
| <p>Unconnected block output ports is set to none, which can lead to dead code.</p> | <p>Set Unconnected block output ports on the Diagnostics > Data Validity > Signals pane of the Configuration Parameters dialog box to error or warning.</p> |
| <p>Unconnected line is set to none, which prevents code generation.</p> | <p>Set Unconnected line on the Diagnostics > Connectivity > Signals pane of the Configuration Parameters dialog box to error or warning.</p> |
| <p>Unspecified bus object at root Output block is set to none, which can lead to an unspecified interface if the model is referenced from another model.</p> | <p>Set Unspecified bus object at root Output block on the Diagnostics > Connectivity > Buses pane of the Configuration Parameters dialog box to error or warning.</p> |
| <p>Mux blocks used to create bus signals is set to none, which can lead to an unintended bus being created in the model.</p> | <p>Set Mux blocks used to create bus signals on the Diagnostics > Connectivity > Buses pane of the Configuration Parameters dialog box to error or warning.</p> |
| <p>Element name mismatch is set to none, which can lead to an unintended interface in the generated code.</p> | <p>Set Element name mismatch on the Diagnostics > Connectivity > Buses pane of the Configuration Parameters dialog box to error or warning.</p> |
| <p>Invalid function-call connection is set to none, which can lead to an error in the operation of the generated code.</p> | <p>Set Invalid function-call connection on the Diagnostics > Connectivity > Function Calls pane of the Configuration Parameters dialog box to error or warning, since this condition can lead to an error in the operation of the generated code.</p> |

See Also

MAAB guideline “jc_0021: Model diagnostic settings”

Check the display attributes of block names

Check the display attributes of subsystem and block names.

Description

Subsystem and block names should be displayed when providing descriptive information. The names should not be displayed if the block function is known from its appearance.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--------------------------|--|
| Name is obvious. | Hide name by clearing Diagram > Format > Show Block Name. |
| Name is not descriptive. | Modify name to be more descriptive or hide name by clearing Diagram > Format > Show Block Name. |
| Name is not displayed. | Display name by selecting Diagram > Format > Show Block Name. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “jc_0061: Display of block names”

Check display for port blocks

Check the **Icon display** setting for Inport and Outport blocks.

Description

The **Icon display** setting is required.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The Icon display setting is not set. | Set the Icon display to Port number for the specified Inport and Outport blocks. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “jc_0081: Icon display for Port block”

Check subsystem names

Check whether subsystem block names include invalid characters.

Description

The names of all subsystem blocks are checked for invalid characters.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The subsystem name contains illegal characters. | Rename the subsystem. Allowed characters include a–z, A–Z, 0–9, underscore (_), and period (.). |
| The subsystem name starts with a number. | Rename the subsystem. |
| The subsystem name starts with an underscore ("_"). | Rename the subsystem. |
| The subsystem name ends with an underscore ("_"). | Rename the subsystem. |
| The subsystem name has consecutive underscores. | Rename the subsystem. |

| Condition | Recommended Action |
|--------------------------------------|-----------------------|
| The subsystem name has blank spaces. | Rename the subsystem. |

Capabilities and Limitations

- You can:
 - Run this check on your library models.
 - Exclude blocks and charts from this check.
- The check does not report invalid characters in subsystem names for:
 - Virtual subsystems
 - Atomic subsystems with **Function Packaging** set to **Inline**

Tips

Use underscores to separate parts of a subsystem name instead of spaces.

See Also

MAAB guideline “jc_0201: Usable characters for Subsystem names”

Check port block names

Check whether Inport and Outport block names include invalid characters.

Description

The names of all Inport and Outport blocks are checked for invalid characters.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The block name contains illegal characters. | Rename the block. Allowed characters include a–z, A–Z, 0–9, underscore (_), and period (.). |
| The block name starts with a number. | Rename the block. |

| Condition | Recommended Action |
|---|--------------------|
| The block name starts with an underscore ("_"). | Rename the block. |
| The block name ends with an underscore ("_"). | Rename the block. |
| The block name has consecutive underscores. | Rename the block. |
| The block name has blank spaces. | Rename the block. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

Tips

Use underscores to separate parts of a block name instead of spaces.

See Also

MAAB guideline “jc_0211: Usable characters for Inport blocks and Outport blocks”

Check character usage in signal labels

Check whether signal line names include invalid characters.

Description

The names of all signal lines are checked for invalid characters.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The signal line name contains illegal characters. | Rename the signal line. Allowed characters include a–z, A–Z, 0–9, underscore (_), and period (.). |

| Condition | Recommended Action |
|---|-------------------------|
| The signal line name starts with a number. | Rename the signal line. |
| The signal line name starts with an underscore ("_"). | Rename the signal line. |
| The signal line name ends with an underscore ("_"). | Rename the signal line. |
| The signal line name has consecutive underscores. | Rename the signal line. |
| The signal line name has blank spaces. | Rename the signal line. |
| The signal line name has control characters. | Rename the signal line. |

Capabilities and Limitations

You can run this check on your library models.

Tips

Use underscores to separate parts of a signal line name instead of spaces.

See Also

MAAB guideline “jc_0221: Usable characters for signal line names”

Check character usage in block names

Check whether block names include invalid characters.

Description

The block names are checked for invalid characters.

This guideline does not apply to subsystem blocks.

Available with Simulink Verification and Validation.

Prerequisite

A prerequisite MAAB guideline for this check is “jc_0201: Usable characters for Subsystem names”.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The block name contains illegal characters. | Rename the block. Allowed characters include a–z, A–Z, 0–9, underscore (_), and period (.). |
| The block name starts with a number. | Rename the block. |
| The block name has blank spaces. | Rename the block. |
| The block name has double byte characters. | Rename the block. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

Tips

Carriage returns are allowed in block names.

See Also

MAAB guideline “jc_0231: Usable characters for block names”

Check Trigger and Enable block names

Check Trigger and Enable block port names.

Description

Block port names should match the name of the signal triggering the subsystem.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Trigger block does not match the name of the signal to which it is connected. | Match Trigger block names to the connecting signal. |

| Condition | Recommended Action |
|--|--|
| Enable block does not match the name of the signal to which it is connected. | Match Enable block names to the connecting signal. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “jc_0281: Naming of Trigger Port block and Enable Port block”

Check for Simulink diagrams using nonstandard display attributes

Check model appearance setting attributes.

Description

Model appearance settings are required to conform to the guidelines when the model is released.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| The toolbar is not visible. | Select 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 . |

| Condition | Recommended Action |
|---|---|
| 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 . |
| 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.

See Also

MAAB guideline “na_0004: Simulink model appearance”

Check MATLAB code for global variables

Check for global variables in MATLAB code.

Description

Verifies that global variables are not used in any of the following:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Global variables are used in one or more of the following: <ul style="list-style-type: none"> • 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. |

See Also

MAAB guideline “na_0024: Global Variables”

Check visibility of block port names

Check the visibility of port block names.

Description

An organization applying the MAAB guidelines must select one of the following alternatives to enforce:

- The name of port blocks are not hidden.
- The name of port blocks must be hidden.

Available with Simulink Verification and Validation.

Input Parameters

All Port names should be shown (Format/Show Name)

Select this check box if all ports should show the name, including subsystems.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Blocks do not show their name and the 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

- You can:
 - Run this check on your library models.
 - Exclude blocks and charts from this check.
- This check does not look in masked subsystems.

See Also

MAAB guideline “na_0005: Port block name visibility in Simulink models”

Check orientation of Subsystem blocks

Check the orientation of subsystem blocks.

Description

Subsystem inputs must be located on the left side of the block, and outputs must be located on the right side of the block.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Subsystem blocks are not using the right orientation | Rotate the subsystem so that inputs are on the left side of block and outputs are on the right side of the block. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “jc_0111: Direction of Subsystem”

Check usage of Relational Operator blocks

Check the position of Constant blocks used in Relational Operator blocks.

Description

When the relational operator is used to compare a signal to a constant value, the constant input should be the second, lower input.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Relational Operator blocks have a Constant block on the first, upper input. | Move the Constant block to the second, lower input. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check.

See Also

MAAB guideline “jc_0131: Use of Relational Operator block”

Check usage of Switch blocks

Check usage of Switch blocks.

Description

This check verifies that the Switch block's control input (the second input) is a Boolean value and that the block is configured to pass the first input when the control input is nonzero.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| The Switch block's control input (second input) is not a Boolean value. | Change the data type of the control input to Boolean. |
| The Switch block is not configured to pass the first input when the control input is nonzero. | Set the block parameter Criteria for passing first input to <code>u2 ~=0</code> . |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

- MAAB guideline “jc_0141: Use of the Switch block”
- “Switch” block

Check usage of buses and Mux blocks

Check usage of buses and Mux blocks.

Description

This check verifies the usage of buses and Mux blocks.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The individual scalar input signals for a Mux block do not have common functionality, data types, dimensions, and units. | Modify the scalar input signals such that the specifications match. |
| The output of a Mux block is not a vector. | Change the output of the Mux block to a vector. |
| All inputs to a Mux block are not scalars. | Make sure that all input signals to Mux blocks are scalars. |
| The input for a Bus Selector block is not a bus signal. | Make sure that the input for all Bus Selector blocks is a bus signal. |

See Also

- MAAB guideline “na_0010: Grouping data flows into signals”
- “Composite Signals”

Check for bitwise operations in Stateflow charts

Identify bitwise operators (&, |, and ^) in Stateflow charts. If you select **Enable C-bit operations** for a chart, only bitwise operators in expressions containing Boolean data types are reported. Otherwise, all bitwise operators are reported for the chart.

Description

Do not use bitwise operators in Stateflow charts, unless you enable bitwise operations.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Stateflow charts with 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: <ul style="list-style-type: none"> • 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

- You can exclude blocks and charts from this check.
- This check applies only to charts that use C as the action language.

See Also

- MAAB guideline “na_0001: Bitwise Stateflow operators”
- “Binary and Bitwise Operations” in the Stateflow documentation
- “hisf_0003: Usage of bitwise operations”

Check for comparison operations in Stateflow charts

Identify comparison operations with different data types in Stateflow objects.

Description

Comparisons should be made between variables of the same data types.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Comparison operations with different data types were found. | Revisit the specified operations to avoid comparison operations with different data types. |
| The Model Advisor could not determine the data types in expressions with comparison operations. | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

MAAB guideline “na_0013: Comparison operation in Stateflow”

Check for unary minus operations on unsigned integers in Stateflow charts

Identify unary minus operations applied to unsigned integers in Stateflow objects.

Description

Do not perform unary minus operations on unsigned integers in Stateflow objects.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Unary minus operations are applied to unsigned integers in Stateflow objects. | Modify the specified objects to remove dependency on unary minus operations. |
| The Model Advisor could not determine the data types in expressions with unary minus operations. | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

MAAB guideline “jc_0451: Use of unary minus on unsigned integers in Stateflow”

Check for equality operations between floating-point expressions in Stateflow charts

Identify equal to operations (==) in expressions where at least one side of the expression is a floating-point variable or constant.

Description

Do not use equal to operations with floating-point data types. You can use equal to operations with integer data types.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Expressions use equal to operations (==) where at least one side of the expression is a floating-point variable or constant. | Modify the specified expressions to avoid equal to operations between floating-point expressions. If an equal to operation is required, a margin of error should be defined and used in the operation. |
| The Model Advisor could not determine the data types in expressions with equality operations. | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

MAAB guideline “jc_0481: Use of hard equality comparisons for floating point numbers in Stateflow”

Check input and output settings of MATLAB Function blocks

Identify MATLAB Function blocks that have inputs, outputs or parameters with inherited complexity or data type properties.

Description

The check identifies MATLAB Function blocks with inherited complexity or data type properties. A results table provides links to MATLAB Function blocks that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| MATLAB Function blocks have inherited interfaces. | <p>Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Function block identified in the results.</p> <p>If applicable, using the “MATLAB Function Block Editor”, make the following modifications in the “Ports and Data Manager”:</p> <ul style="list-style-type: none"> • 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. <p>In the results table, Compiled Value provides suggestions for the actual values after the model compiles. If a MATLAB Function block is defined within a library, explicitly define the interface in the library rather than in the referencing model. If your model has multiple instances of</p> |

| Condition | Recommended Action |
|-----------|---|
| | MATLAB Function blocks defined in a library block, and the instances have different interface properties, consider using multiple library blocks. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

MAAB guideline “na_0034: MATLAB Function block input/output settings”

Check MATLAB Function block metrics

Display complexity and code metrics for MATLAB Function blocks and external MATLAB functions. Report metric violations.

Description

This check provides complexity and code metrics for MATLAB Function blocks and external MATLAB functions. The check additionally reports metric violations.

A results table provides links to MATLAB Function blocks and external MATLAB functions that violate the complexity input parameters.

Available with Simulink Verification and Validation.

Input Parameters

Maximum effective lines of code per function

Provide the maximum effective lines of code per function. Effective lines do not include empty lines, comment lines, or lines with a function `end` keyword.

Minimum density of comments

Provide minimum density of comments. Density is ratio of comment lines to total lines of code.

Maximum cyclomatic complexity per function

Provide maximum cyclomatic complexity per function. Cyclomatic complexity is the number of linearly independent paths through the source code.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| MATLAB Function blocks or external MATLAB functions violate the complexity input parameters. | For the MATLAB Function block or external MATLAB function: <ul style="list-style-type: none"> • 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

You can exclude blocks and charts from this check.

See Also

- “na_0016: Source lines of MATLAB Functions”
- “na_0018: Number of nested if/else and case statement”

Check for mismatches between names of Stateflow ports and associated signals

Check for mismatches between Stateflow ports and associated signal names.

Description

The name of Stateflow input and output should be the same as the corresponding signal.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Signals have names that differ from those of their corresponding Stateflow ports. | Change the names of either the signals or the Stateflow ports. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

MAAB guideline “db_0123: Stateflow port names”

Check scope of From and Goto blocks

Check the scope of From and Goto blocks.

Description

You can use global scope for controlling flow. However, From and Goto blocks must use local scope for signal flows.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| From and Goto blocks are not configured with local scope. | <ul style="list-style-type: none">• Make sure the ports are connected• Change the scope of the specified blocks to local. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

See Also

MAAB guideline “na_0011: Scope of Goto and From blocks”

Requirements Consistency Checks

In this section...

“Identify requirement links with missing documents” on page 3-145

“Identify requirement links that specify invalid locations within documents” on page 3-146

“Identify selection-based links having descriptions that do not match their requirements document text” on page 3-147

“Identify requirement links with path type inconsistent with preferences” on page 3-148

“Identify IBM Rational DOORS objects linked from Simulink that do not link to Simulink” on page 3-149

Identify requirement links with missing documents

Verify that requirements link to existing documents.

Description

You used the Requirements Management Interface (RMI) to associate a design requirements document with a part of your model design and the interface cannot find the specified document.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The requirements document associated with a part of your model design is not accessible at the specified location. | Open the Requirements dialog box and fix the path name of the requirements document or move the document to the specified location. |

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

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

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 that requirement paths are of the type selected in the preferences.

Description

You are using the Requirements Management Interface (RMI) and the paths specifying the location of your requirements documents differ from the file reference type set as your preference.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| <p>The paths indicating the location of requirements documents use a file reference type that differs from the preference specified in the Requirements Settings dialog box, on the Selection Linking tab.</p> | <p>Change the preferred document file reference type or the specified paths by doing one of the following:</p> <ul style="list-style-type: none"> • 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.