

Simulink[®] Verification and Validation[™] Reference



MATLAB[®]&SIMULINK[®]

R2017a



How to Contact MathWorks



Latest news: www.mathworks.com
Sales and services: www.mathworks.com/sales_and_services
User community: www.mathworks.com/matlabcentral
Technical support: www.mathworks.com/support/contact_us



Phone: 508-647-7000



The MathWorks, Inc.
3 Apple Hill Drive
Natick, MA 01760-2098

Simulink[®] Verification and Validation[™] Reference

© COPYRIGHT 2004–2017 by The MathWorks, Inc.

The software described in this document is furnished under a license agreement. The software may be used or copied only under the terms of the license agreement. No part of this manual may be photocopied or reproduced in any form without prior written consent from The MathWorks, Inc.

FEDERAL ACQUISITION: This provision applies to all acquisitions of the Program and Documentation by, for, or through the federal government of the United States. By accepting delivery of the Program or Documentation, the government hereby agrees that this software or documentation qualifies as commercial computer software or commercial computer software documentation as such terms are used or defined in FAR 12.212, DFARS Part 227.72, and DFARS 252.227-7014. Accordingly, the terms and conditions of this Agreement and only those rights specified in this Agreement, shall pertain to and govern the use, modification, reproduction, release, performance, display, and disclosure of the Program and Documentation by the federal government (or other entity acquiring for or through the federal government) and shall supersede any conflicting contractual terms or conditions. If this License fails to meet the government's needs or is inconsistent in any respect with federal procurement law, the government agrees to return the Program and Documentation, unused, to The MathWorks, Inc.

Trademarks

MATLAB and Simulink are registered trademarks of The MathWorks, Inc. See www.mathworks.com/trademarks for a list of additional trademarks. Other product or brand names may be trademarks or registered trademarks of their respective holders.

Patents

MathWorks products are protected by one or more U.S. patents. Please see www.mathworks.com/patents for more information.

Revision History

| | | |
|----------------|-------------|---|
| September 2010 | Online only | New for Version 3.0 (Release 2010b) |
| April 2011 | Online only | Revised for Version 3.1 (Release 2011a) |
| September 2011 | Online only | Revised for Version 3.2 (Release 2011b) |
| March 2012 | Online only | Revised for Version 3.3 (Release 2012a) |
| September 2012 | Online only | Revised for Version 3.4 (Release 2012b) |
| March 2013 | Online only | Revised for Version 3.5 (Release 2013a) |
| September 2013 | Online only | Revised for Version 3.6 (Release 2013b) |
| March 2014 | Online only | Revised for Version 3.7 (Release 2014a) |
| October 2014 | Online only | Revised for Version 3.8 (Release 2014b) |
| March 2015 | Online only | Revised for Version 3.9 (Release 2015a) |
| September 2015 | Online only | Revised for Version 3.10 (Release 2015b) |
| October 2015 | Online only | Rereleased for Version 3.9.1 (Release 2015aSP1) |
| March 2016 | Online only | Revised for Version 3.11 (Release 2016a) |
| September 2016 | Online only | Revised for Version 3.12 (Release 2016b) |
| March 2017 | Online only | Revised for Version 3.13 (Release 2017a) |

Functions — Alphabetical List

1

Block Reference

2

Model Advisor Checks

3

| | |
|--|------------|
| Simulink Verification and Validation Checks | 3-2 |
| Simulink Verification and Validation Checks | 3-2 |
| Modeling Standards Checks | 3-3 |
| Modeling Standards for MAAB | 3-3 |
| Naming Conventions | 3-4 |
| Model Architecture | 3-4 |
| Model Configuration Options | 3-4 |
| Simulink | 3-5 |
| Stateflow | 3-5 |
| MATLAB Functions | 3-5 |
| DO-178C/DO-331 Checks | 3-7 |
| DO-178C/DO-331 Checks | 3-8 |
| Check model object names | 3-9 |
| Check safety-related optimization settings | 3-12 |
| Check safety-related diagnostic settings for solvers | 3-16 |
| Check safety-related diagnostic settings for sample time ... | 3-19 |
| Check safety-related diagnostic settings for signal data ... | 3-21 |
| Check safety-related diagnostic settings for parameters ... | 3-24 |

| | |
|---|-------------|
| Check safety-related diagnostic settings for data used for debugging | 3-27 |
| Check safety-related diagnostic settings for data store memory | 3-29 |
| Check safety-related diagnostic settings for type conversions | 3-31 |
| Check safety-related diagnostic settings for signal connectivity | 3-33 |
| Check safety-related diagnostic settings for bus connectivity | 3-35 |
| Check safety-related diagnostic settings that apply to function-call connectivity | 3-37 |
| Check safety-related diagnostic settings for compatibility . . | 3-39 |
| Check safety-related diagnostic settings for model initialization | 3-40 |
| Check safety-related diagnostic settings for model referencing | 3-43 |
| Check safety-related model referencing settings | 3-46 |
| Check safety-related code generation settings | 3-48 |
| Check safety-related diagnostic settings for saving | 3-54 |
| Check for blocks that do not link to requirements | 3-56 |
| Check state machine type of Stateflow charts | 3-57 |
| Check Stateflow charts for ordering of states and transitions | 3-59 |
| Check Stateflow debugging options | 3-61 |
| Check usage of lookup table blocks | 3-63 |
| Check MATLAB Code Analyzer messages | 3-65 |
| Check MATLAB code for global variables | 3-67 |
| Check for inconsistent vector indexing methods | 3-69 |
| Check for MATLAB Function interfaces with inherited properties | 3-70 |
| Check MATLAB Function metrics | 3-72 |
| Check for blocks not recommended for C/C++ production code deployment | 3-74 |
| Check for variant blocks with 'Generate preprocessor conditionals' active | 3-75 |
| Check Stateflow charts for uniquely defined data objects . . . | 3-76 |
| Check usage of Math Operations blocks | 3-77 |
| Check usage of Signal Routing blocks | 3-80 |
| Check usage of Logic and Bit Operations blocks | 3-81 |
| Check usage of Ports and Subsystems blocks | 3-83 |
| Display model version information | 3-87 |
| IEC 61508, IEC 62304, ISO 26262, and EN 50128 Checks . . . | 3-88 |
| IEC 61508, IEC 62304, ISO 26262, and EN 50128 Checks . . | 3-88 |
| Check model object names | 3-90 |
| Display model metrics and complexity report | 3-93 |

| | |
|---|--------------|
| Check for unconnected objects | 3-95 |
| Check for root Inports with missing properties | 3-97 |
| Check for MATLAB Function interfaces with inherited properties | 3-99 |
| Check MATLAB Function metrics | 3-101 |
| Check for root Inports with missing range definitions | 3-103 |
| Check for root Outports with missing range definitions | 3-105 |
| Check for blocks not recommended for C/C++ production code deployment | 3-107 |
| Check usage of Stateflow constructs | 3-108 |
| Check state machine type of Stateflow charts | 3-114 |
| Check for model objects that do not link to requirements | 3-116 |
| Check for inconsistent vector indexing methods | 3-118 |
| Check MATLAB Code Analyzer messages | 3-120 |
| Check MATLAB code for global variables | 3-122 |
| Check usage of Math Operations blocks | 3-124 |
| Check usage of Signal Routing blocks | 3-126 |
| Check usage of Logic and Bit Operations blocks | 3-128 |
| Check usage of Ports and Subsystems blocks | 3-130 |
| Display configuration management data | 3-134 |
| MathWorks Automotive Advisory Board Checks | 3-136 |
| MathWorks Automotive Advisory Board Checks | 3-138 |
| Check font formatting | 3-139 |
| Check transition orientations in flow charts | 3-141 |
| Check for nondefault block attributes | 3-143 |
| Check signal line labels | 3-145 |
| Check for propagated signal labels | 3-147 |
| Check default transition placement in Stateflow charts | 3-149 |
| Check return value assignments of graphical functions in Stateflow charts | 3-151 |
| Check entry formatting in State blocks in Stateflow charts | 3-152 |
| Check usage of return values from a graphical function in Stateflow charts | 3-153 |
| Check for pointers in Stateflow charts | 3-154 |
| Check for event broadcasts in Stateflow charts | 3-155 |
| Check transition actions in Stateflow charts | 3-156 |
| Check for MATLAB expressions in Stateflow charts | 3-157 |
| Check for indexing in blocks | 3-158 |
| Check file names | 3-160 |
| Check folder names | 3-162 |
| Check for prohibited blocks in discrete controllers | 3-163 |
| Check for prohibited sink blocks | 3-165 |
| Check positioning and configuration of ports | 3-167 |

| | |
|---|--------------|
| Check for matching port and signal names | 3-169 |
| Check whether block names appear below blocks | 3-170 |
| Check for mixing basic blocks and subsystems | 3-171 |
| Check for unconnected ports and signal lines | 3-173 |
| Check position of Trigger and Enable blocks | 3-174 |
| Check usage of tunable parameters in blocks | 3-175 |
| Check Stateflow data objects with local scope | 3-177 |
| Check for Strong Data Typing with Simulink I/O | 3-178 |
| Check usage of exclusive and default states in state machines | 3-179 |
| Check Implement logic signals as Boolean data (vs. double) | 3-181 |
| Check model diagnostic parameters | 3-182 |
| Check the display attributes of block names | 3-185 |
| Check display for port blocks | 3-187 |
| Check subsystem names | 3-188 |
| Check port block names | 3-190 |
| Check character usage in signal labels | 3-192 |
| Check character usage in block names | 3-194 |
| Check Trigger and Enable block names | 3-196 |
| Check for Simulink diagrams using nonstandard display attributes | 3-197 |
| Check MATLAB code for global variables | 3-199 |
| Check visibility of block port names | 3-201 |
| Check orientation of Subsystem blocks | 3-203 |
| Check usage of Relational Operator blocks | 3-204 |
| Check usage of Switch blocks | 3-205 |
| Check usage of buses and Mux blocks | 3-206 |
| Check for bitwise operations in Stateflow charts | 3-207 |
| Check for comparison operations in Stateflow charts | 3-209 |
| Check for unary minus operations on unsigned integers in Stateflow charts | 3-210 |
| Check for equality operations between floating-point expressions in Stateflow charts | 3-211 |
| Check input and output settings of MATLAB Functions | 3-212 |
| Check MATLAB Function metrics | 3-214 |
| Check for mismatches between names of Stateflow ports and associated signals | 3-216 |
| Check scope of From and Goto blocks | 3-217 |
| MISRA C:2012 Checks | 3-218 |
| Check usage of Assignment blocks | 3-218 |
| Check for blocks not recommended for MISRA C:2012 | 3-219 |
| Check for unsupported block names | 3-220 |
| Check configuration parameters for MISRA C:2012 | 3-221 |

| | |
|---|--------------|
| Check for equality and inequality operations on floating-point values | 3-224 |
| Check for bitwise operations on signed integers | 3-224 |
| Check for recursive function calls | 3-225 |
| Check for switch case expressions without a default case . . | 3-226 |
| Check for blocks not recommended for C/C++ production code deployment | 3-226 |
| Requirements Consistency Checks | 3-228 |
| Identify requirement links with missing documents | 3-229 |
| Identify requirement links that specify invalid locations within documents | 3-230 |
| Identify selection-based links having descriptions that do not match their requirements document text | 3-231 |
| Identify requirement links with path type inconsistent with preferences | 3-233 |
| Identify IBM Rational DOORS objects linked from Simulink that do not link to Simulink | 3-235 |
| Model Metrics | 3-236 |
| Model Metrics | 3-237 |
| Count Metrics | 3-237 |
| Complexity Metrics | 3-238 |
| Readability Metrics | 3-238 |
| Compliance Metrics | 3-239 |
| Simulink block metric | 3-240 |
| Subsystem metric | 3-242 |
| Library link metric | 3-244 |
| Effective lines of MATLAB code metric | 3-246 |
| Stateflow chart objects metric | 3-248 |
| Lines of code for Stateflow blocks metric | 3-250 |
| Subsystem depth metric | 3-252 |
| Input output metric | 3-253 |
| Cyclomatic complexity metric | 3-255 |
| Nondescriptive block name metric | 3-257 |
| Data and structure layer separation metric | 3-258 |
| MATLAB code analyzer warnings | 3-259 |
| Model Advisor Check Compliance for Modeling Guidelines for MISRA C:2012 | 3-260 |
| Model Advisor Check Compliance for Modeling Standards for DO-178C/DO-331 | 3-261 |
| Model Advisor Check Compliance for Modeling Standards for ISO 26262 | 3-262 |

| | |
|---|-------|
| Model Advisor Check Compliance for Modeling Standards for MAAB | 3-263 |
| Model Advisor Check Issues for Modeling Guidelines for MISRA C:2012 | 3-264 |
| Model Advisor Check Issues for Modeling Standards for DO-178C/DO-331 | 3-265 |
| Model Advisor Check Issues for Modeling Standards for ISO 26262 | 3-266 |
| Model Advisor check issues for MAAB Standards | 3-267 |

Simulink Coverage Settings

4

| | |
|---|------|
| Coverage Pane | 4-2 |
| Coverage Pane Overview | 4-5 |
| RecordCoverage | 4-6 |
| CovPath | 4-8 |
| CovCompData | 4-9 |
| CovMetricSettings | 4-10 |
| CovSaveOutputData | 4-12 |
| Enable Lookup Table metric | 4-13 |
| Enable Signal Range metric | 4-14 |
| Enable Signal Size metric | 4-15 |
| Enable Objectives and Constraints (SLDV) metric | 4-16 |
| Enable Saturation on Integer Overflow metric | 4-17 |
| Enable Relational Boundary metric | 4-18 |
| CovFilter | 4-19 |
| CovHTMLOptions | 4-20 |
| CovForceBlockReductionOff | 4-22 |
| CovEnable | 4-23 |
| CovEnableCumulative | 4-24 |
| CovScope | 4-25 |
| CovIncludeTopModel | 4-26 |
| CovSaveCumulativeToWorkspaceVar | 4-27 |
| CovCumulativeVarName | 4-28 |
| CovCumulativeReport | 4-29 |
| CovReportOnPause | 4-30 |
| CovModelRefEnable | 4-31 |
| CovModelRefExcluded | 4-32 |
| CovExternalEMLEnable | 4-33 |
| CovSFcnEnable | 4-34 |

| | |
|--------------------------------------|-------------|
| CovMetricStructuralLevel | 4-35 |
| CovBoundaryAbsTol | 4-36 |
| CovBoundaryRelTol | 4-37 |
| CovMedcMode | 4-38 |
| CovUseTimeInterval | 4-39 |
| CovStartTime | 4-40 |
| CovStopTime | 4-41 |
| CovLogicBlockShortCircuit | 4-42 |
| CovUnsupportedBlockWarning | 4-43 |
| Coverage Pane: Results | 4-44 |
| Coverage Results Pane Overview | 4-46 |
| CovShowResultsExplorer | 4-47 |
| CovHighlightResults | 4-48 |
| CovHtmlReporting | 4-49 |
| CovSaveSingleToWorkspaceVar | 4-50 |
| CovSaveName | 4-51 |
| CovNameIncrementing | 4-52 |
| CovDataFileName | 4-53 |
| CovOutputDir | 4-54 |

Model Transformer Tasks

5

| | |
|---|------------|
| Model Transformer Tasks | 5-2 |
| Transform the model to variant system | 5-2 |
| 1. Identify system constants for use in variant transformation | 5-3 |
| 2. Identify blocks that qualify for variant transformation ... | 5-4 |
| 3. Convert blocks to variants | 5-4 |

Clone Detection Tasks

6

| | |
|--|------------|
| Clone Detection Checks | 6-2 |
| Identify Exact Clones | 6-2 |
| Identify library clones and replace them with library blocks . | 6-3 |

| | |
|---|------------|
| Identify graphical clones and replace them with library blocks | 6-3 |
| Identify functional clones and replace them with links to library blocks | 6-4 |
| Identify Similar Clones | 6-4 |
| Identify similar library clones | 6-5 |
| Identify similar graphical clones | 6-5 |
| Identify similar functional clones | 6-5 |

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](#)

Topics

“Create Check for Model Configuration Parameters”

addCheck

Class: ModelAdvisor.FactoryGroup

Package: ModelAdvisor

Add check to folder

Syntax

```
addCheck(fg_obj, check_ID)
```

Description

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

Examples

Add three checks to `rec`:

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


addGroup

Class: ModelAdvisor.Group

Package: ModelAdvisor

Add subfolder to folder

Syntax

```
addGroup(group_obj, child_obj)
```

Description

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

Examples

Add three checks to `rec`:

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

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

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

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

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

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

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

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

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

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

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

addItem

Class: ModelAdvisor.List

Package: ModelAdvisor

Add item to list

Syntax

`addItem(element)`

Description

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

Input Arguments

element Specifies an element to be added to a list in one of the following:

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

addItem

Class: ModelAdvisor.Paragraph

Package: ModelAdvisor

Add item to paragraph

Syntax

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

Description

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

- Character vector
- Element
- Cell array of elements

Examples

Add two lines of text:

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

addProcedure

Class: ModelAdvisor.Group

Package: ModelAdvisor

Add procedure to folder

Syntax

```
addProcedure(group_obj, procedure_obj)
```

Description

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

Examples

Add three procedures to MAG.

```
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');  
  
MAP1=ModelAdvisor.Procedure('com.mathworks.sample.procedure1');  
MAP2=ModelAdvisor.Procedure('com.mathworks.sample.procedure2');  
MAP3=ModelAdvisor.Procedure('com.mathworks.sample.procedure3');  
  
addProcedure(MAG, MAP1);  
addProcedure(MAG, MAP2);  
addProcedure(MAG, MAP3);
```

addProcedure

Class: ModelAdvisor.Procedure

Package: ModelAdvisor

Add subprocedure to procedure

Syntax

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

Description

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

Examples

Add three procedures to MAP.

```
MAP = ModelAdvisor.Procedure('com.mathworks.sample.ProcedureSample');  
  
MAP1=ModelAdvisor.Procedure('com.mathworks.sample.procedure1');  
MAP2=ModelAdvisor.Procedure('com.mathworks.sample.procedure2');  
MAP3=ModelAdvisor.Procedure('com.mathworks.sample.procedure3');  
  
addProcedure(MAP, MAP1);  
addProcedure(MAP, MAP2);  
addProcedure(MAP, MAP3);
```

addRow

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add row to table

Syntax

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

Description

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

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

Examples

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

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

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


end

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

addTask

Class: ModelAdvisor.Group

Package: ModelAdvisor

Add task to folder

Syntax

```
addTask(group_obj, task_obj)
```

Description

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

Examples

Add three tasks to MAG.

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

addTask

Class: ModelAdvisor.Procedure

Package: ModelAdvisor

Add task to procedure

Syntax

```
addTask(procedure_obj, task_obj)
```

Description

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

Examples

Add three tasks to MAP.

```
MAP = ModelAdvisor.Procedure('com.mathworks.sample.ProcedureSample');  
  
MAT1=ModelAdvisor.Task('com.mathworks.sample.task1');  
MAT2=ModelAdvisor.Task('com.mathworks.sample.task2');  
MAT3=ModelAdvisor.Task('com.mathworks.sample.task3');  
  
addTask(MAP, MAT1);  
addTask(MAP, MAT2);  
addTask(MAP, MAT3);
```

Advisor.Application class

Package: Advisor

Run Model Advisor across model hierarchy

Description

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

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

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

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

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

Construction

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

Properties

AnalysisRoot — Name of root model in the model hierarchy to analyze
character vector

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

ID — Unique identifier

character vector

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

UseTempDir — Run analysis in a temporary working folder

false (default) | true

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

Data Types: logical

Methods

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

Copy Semantics

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

Examples

Run Model Advisor Checks on Referenced Model

This example shows how to run a check on model `sldemo_mdhref_counter` referenced from `sldemo_mdhref_basic`.

- 1 In the Command Window, open model `sldemo_mdhref_basic` and referenced model `sldemo_mdhref_counter`.

```
open_system('sldemo_mdhref_basic');  
open_system('sldemo_mdhref_counter');
```

- 2 Save a copy of the models to a work folder, renaming them to `mdhref_basic` and `mdhref_counter`.

```
save_system('sldemo_mdhref_basic','mdhref_basic');  
save_system('sldemo_mdhref_counter','mdhref_counter');
```

- 3 In `mdhref_basic`, change model reference from `sldemo_mdhref_counter` to `mdhref_counter`. Save `mdhref_basic`.

```
set_param('mdhref_basic/CounterA','modelName','mdhref_counter');  
set_param('mdhref_basic/CounterB','modelName','mdhref_counter');  
set_param('mdhref_basic/CounterC','modelName','mdhref_counter');  
save_system('mdhref_basic');
```

- 4 Set root model to `mdhref_basic`.

```
RootModel='mdhref_basic';
```

- 5 Create an `Application` object.

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

- 6 Set root analysis.

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

- 7 Clear all check instances from Model Advisor analysis.

```
deselectCheckInstances(app);
```

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

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

- 9 Run Model Advisor analysis.

```
run(app);
```

- 10 Get analysis results.

```
getResults(app);
```

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

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

- 12 Close the models.

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

Run Model Advisor Checks on a Subsystem

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

- 1 In the Command Window, open model sldemo_mdlref_basic.

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

- 2 Set root model to sldemo_mdlref_basic.

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

- 3 Create an Application object.

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

- 4 Set root analysis to subsystem sldemo_mdlref_basic/CounterA.

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

- 5 Clear all check instances from Model Advisor analysis.

```
deselectCheckInstances(app);
```

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

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

7 Run Model Advisor analysis.

```
run(app);
```

8 Get analysis results.

```
getResults(app);
```

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

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

10 Close the model.

```
close_system('sldemo_mdhref_basic');
```

See Also

Topics

[Class Attributes \(MATLAB\)](#)

[Property Attributes \(MATLAB\)](#)

Introduced in R2015b

Advisor.authoring.generateConfigurationParameterDataFile

Package: Advisor.authoring

Generate XML data file for custom configuration parameter check

Syntax

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

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

Description

`Advisor.authoring.generateConfigurationParameterDataFile(dataFile, source)` generates an XML data file named `dataFile` specifying the configuration parameters for `source`. The data file uses tagging to specify the configuration parameter settings you want. When you create a check for configuration parameters, you use the data file. Each model configuration parameter specified in the data file is a subcheck.

`Advisor.authoring.generateConfigurationParameterDataFile(dataFile, source,Name,Value)` generates an XML data file named `dataFile` specifying the configuration parameters for `source`. It also specifies additional options by one or more optional `Name,Value` arguments. The data file uses tagging to specify the configuration parameter settings you want. When you create a check for configuration parameters, you use the data file. Each model configuration parameter specified in the data file is a subcheck.

Examples

Create data file for configuration parameter check

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

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

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

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

Create data file for Solver pane configuration parameter check with fix action

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

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

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

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

- “Create Check for Model Configuration Parameters”

Input Arguments

dataFile — Name of data file to create

character vector

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

Example: 'myDataFile.xml'

source — Name of model or configuration set

character vector | Simulink.ConfigSet

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

Example: 'vdp'

Name-Value Pair Arguments

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

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

'Pane' — Limit the configuration parameters in the dataFile

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

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

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

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

Data Types: `char`

'FixValues' — Create fix tagging in the dataFile

`false` | `true`

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

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

Data Types: `logical`

See Also

Topics

“Create Check for Model Configuration Parameters”

“Data File for Configuration Parameter Check”

Introduced in R2014a

Advisor.authoring.CustomCheck class

Package: Advisor.authoring

Define custom check

Description

Instances of the `Advisor.authoring.CustomCheck` class provide a container for static methods used as callback functions when defining a configuration parameter check. The configuration parameter check is defined in an XML data file.

Methods

| | |
|-----------------------------|--|
| <code>actionCallback</code> | Register action callback for model configuration check |
| <code>checkCallback</code> | Register check callback for model configuration check |

Copy Semantics

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

See Also

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

Topics

“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

| | |
|-----------------------|---|
| <code>validate</code> | 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 (MATLAB) in the MATLAB Programming Fundamentals documentation.

See Also

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

Topics

“Create Check for Model Configuration Parameters”

Advisor.Manager class

Package: Advisor

Manage applications

Description

The `Advisor.Manager` class defines application objects.

Methods

| | |
|-------------------------------------|--|
| <code>createApplication</code> | Create <code>Advisor.Application</code> object |
| <code>getApplication</code> | Return handle to <code>Advisor.Application</code> object |
| <code>refresh_customizations</code> | Refresh Model Advisor check information cache |

Copy Semantics

Handle. To learn how handle classes affect copy operations, see [Copying Objects \(MATLAB\)](#) in the MATLAB documentation.

See Also

Topics

[Class Attributes \(MATLAB\)](#)

[Property Attributes \(MATLAB\)](#)

Introduced in R2015b

allNames

Class: `cv.cvdatagroup`

Package: `cv`

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

Syntax

```
models = allNames(cvdg)
models = allNames(cvdg, simMode)
```

Description

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

`models = allNames(cvdg)` returns a cell array of character vectors identifying all model names associated with the `cvdata` objects in `cvdg`, an instantiation of the `cv.cvdatagroup` class.

`models = allNames(cvdg, simMode)` returns a cell array of character vectors identifying all model names having the simulation mode `simMode` associated with the `cvdata` objects in `cvdg`, an instantiation of the `cv.cvdatagroup` class.

Input Arguments

cvdg — Class instance

object

Instance of class `cv.cvdatagroup`.

simMode — Simulation mode

character vector

Simulation mode associated with the `cvdata` objects in `cvdg`. Valid values include the following:

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

Output Arguments

models — Model names

cell array of character vectors

All model names associated with the `cvdata` objects in `cvdg`.

Examples

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

```
a = cvdata;
b = cvdata;
c = cvdata;
cvdg = cv.cvdatabgroup;
add (cvdg, a, b, c);
model_names = allNames(cvdg);
model_names_sim_mode = allnames(cvdg, 'ModelRefSIL')
```

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](#)

Topics

“Create Check for Model Configuration Parameters”

complexityinfo

Retrieve cyclomatic complexity coverage information from `cvdata` object

Syntax

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

Description

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

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

Input Arguments

cvdo

`cvdata` object

object

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

| Object Specification | Description |
|--------------------------|--|
| <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 |

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

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

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

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

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

mode

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

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

Output Arguments

complexity

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

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

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

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

Examples

Open the `sldemo_fuelsys` model and create the test specification object `testObj`. Enable decision, condition, and MCDC coverage for `sldemo_fuelsys` and execute

testObj using `cvsim`. Use `complexityinfo` to retrieve cyclomatic complexity results for the Throttle subsystem. The Throttle subsystem itself does not record cyclomatic complexity coverage results, but the contents of the subsystem do record cyclomatic complexity coverage.

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

Alternatives

Use the coverage settings to collect and display cyclomatic complexity coverage results in the coverage report:

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

See Also

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

Topics

“Cyclomatic Complexity”

Introduced in R2011a

conditioninfo

Retrieve condition coverage information from cvdata object

Syntax

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

Description

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

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

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

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

Input Arguments

cvdo

cvdata object

object

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

| | |
|---------------------|--|
| BlockPath | Full path to a Simulink model or block |
| BlockHandle | Handle to a Simulink model or block |
| 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} | Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |

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

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

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

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

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

mode

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

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

ignore_descendants

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

1 to ignore coverage of descendant objects

0 (default) to collect coverage of descendant objects

Output Arguments

coverage

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

| | |
|-------------------------------|--|
| <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> | Character vector 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 to collect condition coverage for a model:

- 1 Open the model for which you want to collect condition coverage.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Under **Coverage metrics**, select **Condition** as the structural coverage level.
- 5 On the **Coverage > Results** pane, specify the output you need.

- 6 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 7 Simulate the model and review the results.

See Also

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

Topics

“Condition Coverage (CC)”

Introduced in R2006b

createApplication

Class: Advisor.Manager

Package: Advisor

Create Advisor.Application object

Syntax

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

Description

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

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

Input Arguments

Name-Value Pair Arguments

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

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

'UseTempDir' — Create Advisor.Application object that operates in a temporary working folder

false (default) | true

Data Types: logical

Output Arguments

app — Application

Advisor.Application object

Constructed Advisor.Application object.

See Also

See Also

Advisor.Application | Advisor.Manager.getApplication

Introduced in R2015b

cv.cvdatagroup class

Package: cv

Collection of cvdata objects

Description

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

Construction

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

Methods

| | |
|--------------------|--|
| allNames | Get names of all models associated with cvdata objects in cv.cvdatagroup |
| allSimulationModes | Get names of all simulation modes 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 (MATLAB) 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);
```

allSimulationModes

Class: cv.cvdatagroup

Package: cv

Get names of all simulation modes associated with `cvdata` objects in `cv.cvdatagroup`

Syntax

```
simModes= allSimulationModes(cvdg)
simModes= allSimulationModes(cvdg, modelName)
```

Description

Get names of all simulation modes associated with `cvdata` objects in `cv.cvdatagroup`.

`simModes= allSimulationModes(cvdg)` returns a cell array of character vectors identifying all simulation modes associated with the `cvdata` objects in `cvdg`, an instantiation of the `cv.cvdatagroup` class.

`simModes= allSimulationModes(cvdg, modelName)` returns a cell array of character vectors identifying all simulation modes associated with the model `modelName` in `cvdg`, an instantiation of the `cv.cvdatagroup` class.

Input Arguments

cvdg — Class instance

object

Instance of class `cv.cvdatagroup`.

modelName — Name of the model

character vector

Model with which simulation modes are associated.

Output Arguments

simModes — Simulation modes

cell array of character vectors

All simulation modes associated with `cvdg`. Valid values include the following:

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

Examples

Get the Simulation Modes Associated with Three `cvdata` Sets

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_simModes = allSimulationModes(cvdg)
```

cvexit

Exit model coverage environment

Syntax

```
cvexit
```

Description

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

Introduced in R2006b

cvhtml

Produce HTML report from model coverage objects

Syntax

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

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, cvdo, simMode)` creates an HTML report for the models having the simulation mode `simMode`.

Input Arguments

cvdo — Class instance

object

`cv.cvdatagroup` object.

file — HTML file

character vector

The HTML file in the MATLAB current folder where `cvhtml` stores the results.

options — Report options

character vector

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

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

| Option | Description | Default |
|--------|--|---------|
| -sRT | Show report | on |
| -sVT | Web view mode | off |
| -aTS | Include each test in the model summary | on |
| -bRG | Produce bar graphs in the model summary | on |
| -bTC | Use two color bar graphs (red, blue) | on |
| -hTR | Display hit/count ratio in the model summary | off |
| -nFC | Exclude fully covered model objects from report | off |
| -nFD | Exclude fully covered model object details from report | 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 |

simMode — Simulation mode

character vector

Simulation mode associated with the models. Valid values include the following:

| Object Specification | Description |
|----------------------|---|
| 'Normal' | Model in Normal simulation mode. |
| 'SIL' (or 'PIL') | Model in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode. |

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

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 to create a model coverage report in an HTML file:

- 1 Open the model for which you want a model coverage report.
- 2 In the Simulink Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 On the **Coverage > Results** pane, select **Generate report automatically after analysis**.
- 5 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 6 Simulate the model and review the generated report.

See Also

`cv.cvdgroup` | `cvsim` | `cvmodelview`

Topics

“Create HTML Reports with cvhtml”

Introduced before R2006a

cvload

Load coverage tests and stored results into memory

Syntax

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

Description

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

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

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

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

Examples

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

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

See Also

cvsave

Topics

“Load Stored Coverage Test Results with cvload”

Introduced before R2006a

cvmodelview

Display model coverage results with model coloring

Syntax

```
cvmodelview(cvdo)  
cvmodelview(cvdo, simMode)
```

Description

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

`cvmodelview(cvdo, simMode)` displays coverage results from the `cvdata` object `cvdo` by coloring the objects in the model that have model coverage results for the specified simulation mode.

Input Arguments

cvdo — Class instance
object

`cv.cvdatagroup` object.

simMode — Simulation mode
character vector

Simulation modes associated with the models. Valid values include the following:

| Object Specification | Description |
|----------------------|---|
| 'Normal' | Model in Normal simulation mode. |
| 'SIL' (or 'PIL') | Model in Software-in-the-Loop (SIL) or Processor-in-the-Loop (PIL) simulation mode. |

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

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 to display model coverage results by coloring objects:

- 1 Open the model.
- 2 Select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 On the **Coverage > Results** pane, select **Display coverage results using model coloring**.
- 5 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 6 Simulate the model and review the results.

See Also

cvhtml | cvsim

Topics

“View Coverage Results in a Model”

Introduced in R2006b

cvresults

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

Syntax

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

Description

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

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

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

See Also

Introduced in R2016a

cvsave

Save coverage tests and results to file

Syntax

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

Description

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

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

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

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

Input Arguments

filename

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

model

Handle to a Simulink model

cvd

cvdata object

cvto

cvtest object

cell_array

Cell array of cvtest objects

Examples

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

```
model = 'slvndemo_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 `slvndemo_ratelim_harness` model from two simulations:

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

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

```

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

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

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

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

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

```

As in the preceding example, save cumulative coverage results for the Adjustable Rate Limiter subsystem in the `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 to save cumulative coverage results for a model:

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

See Also

cvload

Topics

“Save Test Runs to File with cvsave”

Introduced before R2006a

cvsim

Simulate and return model coverage results for test objects

Syntax

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

Description

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

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

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

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

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

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

Input Arguments

modelName

Name of model specified as a character vector

cvto

`cvtest` object that specifies coverage options for the simulation

ParameterStruct

Model parameters specified as a structure

Name-Value Pair Arguments

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

'ParameterName'

Name of the model parameter to be specified for simulation

'ParameterValue'

Value of the model parameter

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

Output Arguments

cvdo

`cvdata` object

simOut

A `Simulink.SimulationOutput` class (`Simulink`) 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.cvdatalogroup` | `cvtest` | `sim`

Introduced before R2006a

cvtest

Create model coverage test specification object

Syntax

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

Description

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

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

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

Input Arguments

root

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

label

Label for test object

setupcmd

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

Output Arguments

cvto

A test specification object with the following structure.

| Field | Description |
|--------------------------------------|--|
| <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> | Character vector 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>sfcnSettings.enableSfcn</code> | Set to 1 to enable coverage for C/C++ S-Function blocks 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 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> | Character vector specifying name of coverage filter file, if you have excluded objects from coverage recording. See “Coverage Filter Rules and Files”. |

Examples

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

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

See Also

`cvsim` | `cv.cvdatabgroup`

Topics

“Create Tests with `cvtest`”

Introduced before R2006a

decisioninfo

Retrieve decision coverage information from `cvdata` object

Syntax

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

Description

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

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

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

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

Input Arguments

cvdo

`cvdata` object

object

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

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

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

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

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

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

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

mode

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

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

ignore_descendants

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

Output Arguments

coverage

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

| | |
|-------------------------------|---|
| <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:

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

Examples

Open the `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 to collect and display decision coverage results:

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

- 5** On the **Coverage > Resultspane**, specify the output you need.
- 6** Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 7** Simulate the model and review the results.

See Also

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

Topics

“Decision Coverage (DC)”

Introduced in R2006b

executioninfo

Retrieve execution coverage information from `cvdata` object

Syntax

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

Description

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

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

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

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

Input Arguments

cvdo

`cvdata` object

object

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

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

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

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

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

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

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

mode

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

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

ignore_descendants

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

Output Arguments

coverage

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

`covered_outcomes`

Number of execution outcomes satisfied for `object`

See Also

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

Topics

“Execution Coverage (EC)”

Introduced in R2006b

delete

Class: `Advisor.Application`

Package: `Advisor`

Delete `Advisor.Application` object

Syntax

```
delete(app)
```

Description

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

Examples

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

Input Arguments

app — `Advisor.Application` object to destroy

handle

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

See Also

See Also

`Advisor.Manager.createApplication` | `Advisor.Application.setAnalysisRoot`

Introduced in R2015b

deselectCheckInstances

Class: `Advisor.Application`

Package: `Advisor`

Clear check instances from Model Advisor analysis

Syntax

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

Description

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

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

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

Input Arguments

app — Application

`Advisor.Application` object

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

Name-Value Pair Arguments

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

quotes (' '). You can specify several name and value pair arguments in any order as Name1,Value1,...,NameN,ValueN.

'IDs' — Checks instance IDs

cell array

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

Data Types: cell

Examples

Clear All Check Instances from Model Advisor Analysis

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

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

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

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

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

Clear Check Instance from Model Advisor Analysis Using Instance ID

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

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

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

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

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

See Also

See Also

[Advisor.Manager.createApplication](#) | [Advisor.Application.setAnalysisRoot](#) |
[Advisor.Application.getCheckInstanceIDs](#) | [Advisor.Application.selectCheckInstances](#)

Introduced in R2015b

deselectComponents

Class: Advisor.Application

Package: Advisor

Clear model components from Model Advisor analysis

Syntax

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

Description

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

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

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

Input Arguments

app — Application

Advisor.Application object

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

Name-Value Pair Arguments

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

'IDs' — Component IDs

cell array

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

Data Types: cell

'HierarchicalSelection' — Clear component and component children

false (default) | true

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

Data Types: logical

Examples

Clear All Components from Model Advisor Analysis

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

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

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

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

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

Clear Components from Model Advisor Analysis Using IDs

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

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

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

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

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

See Also

See Also

[Advisor.Manager.createApplication](#) | [Advisor.Application.setAnalysisRoot](#) |
[Advisor.Application.selectComponents](#)

Introduced in R2015b

generateReport

Class: `Advisor.Application`

Package: `Advisor`

Generate report for Model Advisor analysis

Syntax

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

Description

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

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

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

Input Arguments

app — **Application**

`Advisor.Application` object

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

Name-Value Pair Arguments

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

quotes (' '). You can specify several name and value pair arguments in any order as Name1,Value1,...,NameN,ValueN.

'Location' — Path to report location

character vector

'Name' — Report name

character vector

Examples

Generate Report

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

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

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

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

% Run Model Advisor analysis
run(app);

% Generate report
report = generateReport(app);

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

Generate Report with Specified Name and Location

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

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

% Create an Application object
```

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

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

% Run Model Advisor analysis
run(app);

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

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

See Also

See Also

[Advisor.Manager.createApplication](#) | [Advisor.Application.setAnalysisRoot](#) | [Advisor.Application.run](#)

Introduced in R2015b

get

Class: cv.cvdatagroup

Package: cv

Get cvdata object

Syntax

```
get(cvdg, model_name)
get(cvdg, model_name, simMode)
```

Description

Get cvdata object.

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

`get(cvdg, model_name, simMode)` returns the `cvdata` object in the `cv.cvdatagroup` object `cvdg` that corresponds to the model specified in `model_name` having the simulation mode `simMode`.

Input Arguments

cvdg — Class instance

object

Instance of class `cv.cvdatagroup`.

model_name — Name of the model

character vector

Model to which the `cvdata` object in the `cv.cvdatagroup` object `cvdg` corresponds.

simMode — Simulation mode

character vector

Simulation mode for the `cvdata` object in the `cv.cvdatagroup` object. Valid values include the following:

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

Examples

Get a `cvdata` object from the specified Simulink model:

```
get(cvdg, 'slvnvdemo_cv_small_controller');
get(cvdg, 'slvnvdemo_cv_small_controller', 'ModelRefSIL');
```

getAll

Class: cv.cvdatagroup

Package: cv

Get all cvdata objects

Syntax

```
getAll(cvdg)  
getAll(cvdg, simMode)
```

Description

Get all cvdata objects.

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

`getAll(cvdg, simMode)` returns all cvdata objects in the `cv.cvdatagroup` object `cvdg` having the simulation mode `simMode`.

Input Arguments

cvdg — Class instance

object

Instance of class `cv.cvdatagroup`.

simMode — Simulation mode

character vector

Simulation mode associated with the cvdata objects in `cvdg`. Valid values include the following:

| Object Specification | Description |
|----------------------|----------------------------------|
| 'Normal' | Model in Normal simulation mode. |

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

Examples

Return all cvdata objects from the specified Simulink model:

```
getAll(cvdg, 'slvndemo_cv_small_controller');  
getAll(cvdg, 'slvndemo_cv_small_controller', 'ModelRefSIL');
```

getApplication

Class: Advisor.Manager

Package: Advisor

Return handle to `Advisor.Application` object

Syntax

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

Description

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

Input Arguments

Name-Value Pair Arguments

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

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

'Id' — `Advisor.Application` object ID

`Advisor.Application` object

Data Types: `function_handle`

'Root' — Root model name

character vector

Data Types: `char`

'RootType' — Type of root analysis

'Model' (default) | 'Subsystem'

Data Types: char

Output Arguments

app — Handle to `Advisor.Application` object

`Advisor.Application` object

Data Types: `function_handle`

See Also

See Also

`Advisor.Application` | `Advisor.Manager.createApplication`

Introduced in R2015b

getCheckInstanceIDs

Class: Advisor.Application

Package: Advisor

Obtain check instance IDs

Syntax

CheckInstanceIDs = getCheckInstanceIDs (app)

CheckInstanceIDs = getCheckInstanceIDs (app, CheckID)

Description

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

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

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

Input Arguments

app — Application

Advisor.Application object

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

CheckID — Check ID associated with Model Advisor check

character vector

Check ID associated with Model Advisor check.

Example: `'mathworks.design.UnconnectedLinesPorts'`

Output Arguments

CheckInstanceIDs — Cell array of check instance IDs

cell array

Check instance IDs, returned as a cell array of IDs

Examples

Obtain Check Instance IDs

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

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

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

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

% Select all check instances
selectCheckInstances(app);

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

Obtain Check Instance ID for a Check

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

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

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

% Set the Application object root analysis
```



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

% Select all check instances
selectCheckInstances(app);

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

Alternatives

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

See Also

See Also

[Advisor.Manager.createApplication](#) | [Advisor.Application.setAnalysisRoot](#) | [Advisor.Application.selectCheckInstances](#)

Introduced in R2015b

getCoverageInfo

Retrieve coverage information for Simulink Design Verifier blocks from `cvdata` object

Syntax

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

Description

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

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

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

Input Arguments

cvdo

`cvdata` object

object

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

| | |
|------------------------|-------------------------------|
| <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> | Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |

Default:**metric**

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

| | |
|-------------------------|------------------------|
| <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 to collect and display coverage results for Simulink Design Verifier library blocks:

- 1 Open the model.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Under **Coverage metrics**, select **Objectives and constraints**.
- 5 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 6 Simulate the model and review the results.

See Also

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

Topics

“Simulink Design Verifier Coverage”

Introduced in R2009b

getEntry

Class: ModelAdvisor.Table

Package: ModelAdvisor

Get table cell contents

Syntax

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

Description

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

Input Arguments

| | |
|---------------------|--|
| <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”

Topics

“Create Model Advisor Checks”

getID

Class: ModelAdvisor.Check

Package: ModelAdvisor

Return check identifier

Syntax

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

Description

`id = getID(check_obj)` returns the ID of the check `check_obj`. `id` is a unique identifier for the check.

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

See Also

“Model Advisor Customization”

Topics

“Define Custom Checks”

“Create Model Advisor Checks”

execute

Class: slmetric.Engine

Package: slmetric

Collect metric data

Syntax

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

Description

Collect model metric data for the specified metric engine object.

`execute(metric_engine)` collects metric data for available model metrics, which can include MathWorks metrics and custom metrics.

`execute(slmetric_obj, MetricIDs)` collects metric data for only the specified metrics, which can be MathWorks metrics or custom metrics.

Input Arguments

metric_engine — Metric engine object

slmetric.Engine object

Create a slmetric.Engine object.

Example:

```
metric_engine = slmetric.Engine();
```

MetricIDs — Metric identifier

character vector | cell array of character vectors

Metric identifier for “Model Metrics” on page 3-236 or custom model metrics that you create. You can specify one or multiple metric identifiers. You can get metric identifiers by calling `slmetric.metric.getAvailableMetrics`.

Example: `'mathworks.metrics.DescriptiveBlockNames'`

Examples

Collect and Access Metric Data for a Model

Collect and access model metric data for the model `sldemo_md1ref_basic`.

Create an `slmetric.Engine` object and set the root in the model for analysis.

```
metric_engine = slmetric.Engine();
```

```
% Include referenced models and libraries in the analysis, these properties are on by default
metric_engine.AnalyzeModelReferences = 1;
metric_engine.AnalyzeLibraries = 1;
```

```
setAnalysisRoot(metric_engine, 'Root', 'sldemo_md1ref_basic');
```

Collect model metric data

```
execute(metric_engine);
```

Get the model metric data that returns an array of `slmetric.metric.ResultCollection` objects, `res_col`.

```
res_col = getMetrics(metric_engine, 'mathworks.metrics.SimulinkBlockCount');
```

Display the results for the `mathworks.metrics.SimulinkBlockCount` metric.

```
for n=1:length(res_col)
    if res_col(n).Status == 0
        result = res_col(n).Results;

        for m=1:length(result)
            disp(['MetricID: ', result(m).MetricID]);
            disp([' ComponentPath: ', result(m).ComponentPath]);
            disp([' Value: ', num2str(result(m).Value)]);
            disp([' AggregatedValue: ', num2str(result(m).AggregatedValue)]);
        end
    end
end
```

```

        else
            disp(['No results for:', result(n).MetricID]);
        end
        disp(' ');
    end
end

```

Collect and Access Metric Data for One Metric

Collect and access model metric data for the model `sldemo_mdref_basic`.

Create an `slmetric.Engine` object and set the root in the model for analysis.

```
metric_engine = slmetric.Engine();
```

```

% Include referenced models and libraries in the analysis, these properties are on by default
metric_engine.AnalyzeModelReferences = 1;
metric_engine.AnalyzeLibraries = 1;

```

```
setAnalysisRoot(metric_engine, 'Root', 'sldemo_mdref_basic');
```

Collect model metric data

```
execute(metric_engine, 'mathworks.metric.SimulinkBlockCount');
```

Get the model metric data that returns an array of `slmetric.metric.ResultCollection` objects, `res_col`.

```
res_col = getMetrics(metric_engine, 'mathworks.metrics.SimulinkBlockCount');
```

Display the results for the `mathworks.metrics.SimulinkBlockCount` metric.

```

for n=1:length(res_col)
    if res_col(n).Status == 0
        result = res_col(n).Results;

        for m=1:length(result)
            disp(['MetricID: ', result(m).MetricID]);
            disp([' ComponentPath: ', result(m).ComponentPath]);
            disp([' Value: ', num2str(result(m).Value)]);
            disp([' AggregatedValue: ', num2str(result(m).AggregatedValue)]);
        end
    else
        disp(['No results for:', result(n).MetricID]);
    end
    disp(' ');
end

```

end

See Also

See Also

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

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2016a

getAnalysisRootMetric

Class: slmetric.Engine

Package: slmetric

Get metric data for one metric for analysis root only

Syntax

```
metricResult = getAnalysisRootMetric(metric_engine, MetricID)
```

Description

Get metric data from the metric engine where the root of analysis was set using `slmetric.Engine.setAnalysisRoot`.

`metricResult = getAnalysisRootMetric(metric_engine, MetricID)` get the metric data from `metric_engine`, for a specified metric identifier, `MetricID`, only for the analysis root.

Input Arguments

metric_engine — Collects and accesses metric data

`slmetric.Engine` object

When you call `slmetric.Engine.execute`, `metric_engine` collects metric data for all available metrics or for the specified `MetricID`. Calling `slmetric.Engine.getMetrics` accesses the collected metric data in `metric_engine`.

MetricID — Metric identifier

character vector

Metric identifier for “Model Metrics” on page 3-236 or custom model metrics, that you create. You can get metric identifiers by calling `slmetric.metric.getAvailableMetrics`.

Example: `'mathworks.metrics.DescriptiveBlockNames'`

Output Arguments

metricResult — Result of metric analysis on the analysis root

`slmetric.metric.Result` object

Outputs the object of the `slmetric.metric.Result` object containing the result data for the requested analysis root and metric.

Examples

Collect and Access Metric Data for the Analysis Root

This example shows how to set the analysis root, collect, and access the metric data for a metric.

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

% Specify the model for metric analysis
setAnalysisRoot(metric_engine, 'Root', 'sldemo_fuelsys');

% Collect model metrics for only the analysis root
metricID = 'mathworks.metrics.SimulinkBlockCount';
execute(metric_engine, metricID);

metricResult = getAnalysisRootMetric(metric_engine, metricID);
```

See Also

See Also

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

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2017a

getErrorLog

Class: slmetric.Engine

Package: slmetric

Get error log

Syntax

```
metricLog = getErrorLog(metric_engine)
```

Description

Get a log of errors and warnings that occurred during metric data collection of a specified metric engine object. The log includes errors that occurred during the execution of metric algorithms, model compilation, and metric data validation.

```
metricLog = getErrorLog(metric_engine).
```

Input Arguments

metric_engine — Metric engine object

slmetric.Engine object

Constructed slmetric.Engine object.

Output Arguments

metricLog — Log of metric errors and warnings

string array

The `metricLog` string contains the errors and warnings from metric analysis and is formatted in HTML.

Examples

Get Error Log

This example shows how to create a `slmetric.Engine` object, set the analysis root, generate metrics, and create and display the error log for the model `sldemo_fuelsys`.

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

% Specify model for metric analysis
setAnalysisRoot(metric_engine, 'Root', 'sldemo_fuelsys');

% Collect model metrics for only the analysis root
metricID = 'mathworks.metrics.SimulinkBlockCount';
execute(metric_engine, metricID);

metricLog = getErrorLog(metricEngine);
disp(metricLog);
```

See Also

See Also

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

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2017a

getMetricDistribution

Class: slmetric.Engine

Package: slmetric

Get metric distribution

Syntax

```
getMetricDistribution(metric_engine, MetricID)
```

Description

`getMetricDistribution(metric_engine, MetricID)` generates distribution for a specific metric, `MetricID`, for the metric data in the `slmetric.Engine` object, `metric_engine`. The distribution is on the metric data from the `Value` property of a `slmetric.metric.Result` object.

Input Arguments

metric_engine — Collects and accesses metric data

`slmetric.Engine` object

When you call `slmetric.Engine.execute`, `metric_engine` collects metric data for all available metrics or for the specified `MetricID`. Calling `slmetric.Engine.getMetrics` accesses the collected metric data in `metric_engine`.

MetricID — Metric identifier

character vector

Metric identifier for a model metric, specified as a character vector.

Example: `'mathworks.metrics.DescriptiveBlockNames'`

Output Arguments

dist — Distribution of the metric data

`slmetric.metric.MetricDistribution` object

Distribution of the metric data contains the following properties:

- `MetricID` is a char array that returns the metric ID specified in the `getMetricDistribution` function call.
- `BinCounts` is an `uint64` array of the number of components corresponding to a bin.
- `BinEdges` is a double array of equally spaced edges of each bin.

Examples

Generate Metric Distribution

To generate the distribution for a specific metric, create a `slmetric.Engine` object, set the analysis root for the `sldemo_fuelsys` model, and create a histogram of the data.

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

% Specify model for metric analysis
setAnalysisRoot(metric_engine, 'Root', 'sldemo_fuelsys');

% Collect model metrics and get distribution
metricID = 'mathworks.metrics.SimulinkBlockCount';
execute(metric_engine, metricID);
dist = getMetricDistribution(metric_engine, metricID);

% View the distribution using a histogram to show the number of components corresponding
histogram('BinEdges',dist.BinEdges,'BinCounts',dist.BinCounts);
```

See Also

See Also

`slmetric.Engine` | `slmetric.metric.Result` | `slmetric.metric.ResultCollection` | `histcounts` | `slmetric.metric.getAvailableMetrics`

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2017a

getMetrics

Class: slmetric.Engine

Package: slmetric

Access model metric data

Syntax

```
Results = getMetrics(metric_engine)
Results = getMetrics(metric_engine, MetricIDs)
Results = getMetrics(metric_engine, MetricIDs, 'AggregationDepth', ad)
```

Description

Access model metric data from the specified model metric engine. When you call `slmetric.Engine.execute`, the metric engine collects the metric data. The returned metric data is based on defined architectural components. The components are these Simulink objects:

- Model
- Model block
- Subsystem block
- Chart
- MATLAB Function block
- Protected model

`Results = getMetrics(metric_engine)` returns metric data for all metrics that the metric engine executed.

`Results = getMetrics(metric_engine, MetricIDs)` returns metric data for the specified metric identifiers.

`Results = getMetrics(metric_engine, MetricIDs, 'AggregationDepth', ad)` returns metric data for the specified metric identifiers and specifying how to aggregate data.

Input Arguments

metric_engine — Collects and accesses metric data

slmetric.Engine object

When you call `slmetric.Engine.execute`, `metric_engine` collects metric data for all available MathWorks metrics or for the specified `MetricIDs`. Calling `slmetric.Engine.getMetrics` accesses the collected metric data in `metric_engine`.

MetricIDs — Metric identifier

character vector | cell array of character vectors

Metric identifier for “Model Metrics” on page 3-236 or custom model metrics that you create. You can specify one or multiple metric identifiers. You can get metric identifiers by calling `slmetric.metric.getAvailableMetrics`.

Example: `'mathworks.metrics.DescriptiveBlockNames'`

AggregationDepth — Depth or level in the component hierarchy to which getMetrics aggregates the metric data

All (default) | None

Depth or level in the component for which `getMetrics` aggregates the metric data, specified as a name-value pair argument. Values are one of the following:

- **All** — `getMetrics` aggregates the detailed results to the component level. Then, the component level results are used to calculate the aggregated values by traversing the component hierarchy. `getMetrics` returns only the component-level results.
- **None** — Do not aggregate measures and values. If you specify this option, `getMetrics` returns metric values as collected by the metric algorithm. For example, if the metric algorithm returns detailed results, the detailed results are returned without aggregation. `AggregatedValue` and `AggregatedMeasures` properties of the returned `slmetric.metric.Result` objects are empty.

Example: `'AggregationDepth', 'None'`

Data Types: char

Output Arguments

Results — Metric data from the metric engine

Array of `slmetric.metric.Result` objects

Metric data from the metric engine.

Examples

Collect and Access Metric Data for a Model

Collect and access model metric data for the model `sldemo_mdhref_basic`.

Create an `slmetric.Engine` object and set the root in the model for analysis.

```
metric_engine = slmetric.Engine();
```

```
% Include referenced models and libraries in the analysis, these properties are on by default
metric_engine.AnalyzeModelReferences = 1;
metric_engine.AnalyzeLibraries = 1;
```

```
setAnalysisRoot(metric_engine, 'Root', 'sldemo_mdhref_basic');
```

Collect model metric data

```
execute(metric_engine, 'mathworks.metric.SimulinkBlockCount');
```

Get the model metric data that returns an array of `slmetric.metric.ResultCollection` objects, `res_col`.

```
res_col = getMetrics(metric_engine, 'mathworks.metrics.SimulinkBlockCount');
```

Display the results for the `mathworks.metrics.SimulinkBlockCount` metric.

```
for n=1:length(res_col)
    if res_col(n).Status == 0
        result = res_col(n).Results;

        for m=1:length(result)
            disp(['MetricID: ', result(m).MetricID]);
            disp([' ComponentPath: ', result(m).ComponentPath]);
            disp([' Value: ', num2str(result(m).Value)]);
        end
    end
end
```

```
        disp([' AggregatedValue: ', num2str(result(m).AggregatedValue)]);
    end
else
    disp(['No results for:', result(n).MetricID]);
end
disp(' ');
end
```

See Also

See Also

slmetric.metric.Result | slmetric.metric.ResultCollection |
slmetric.metric.getAvailableMetrics

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2016a

getResults

Class: Advisor.Application

Package: Advisor

Access Model Advisor analysis results

Syntax

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

Description

Access Application object analysis results.

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

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

Input Arguments

app — Application

Advisor.Application object

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

Name-Value Pair Arguments

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

'IDs' — Component IDs

cell array

Component IDs, as specified as a cell array of IDs

Data Types: `cell`

Output Arguments

Result – Analysis results

cell array of `ModelAdvisor.SystemResult` objects

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

See Also

See Also

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

Introduced in R2015b

getStatistics

Class: `slmetric.Engine`

Package: `slmetric`

Get statistics on metric data

Syntax

```
stats = getStatistics(metric_engine, MetricID)
```

Description

Generate statistics on the `Value` properties of the `slmetric.metric.Result` objects for the specified metric engine object, `metric_engine`.

`stats = getStatistics(metric_engine, MetricID)` generate statistics for the specified metric identifier.

Input Arguments

metric_engine — Collects and accesses metric data

`slmetric.Engine` object

When you call `slmetric.Engine.execute`, `metric_engine` collects metric data for all available metrics or for the specified `MetricID`. Calling `slmetric.Engine.getMetrics` accesses the collected metric data in `metric_engine`.

MetricID — Metric identifier

character vector

Metric identifier for “Model Metrics” on page 3-236 or custom model metrics that you create. You can get metric identifiers by calling `slmetric.metric.getAvailableMetrics`.

Example: `'mathworks.metrics.DescriptiveBlockNames'`

Output Arguments

stats — Metric statistics

`slmetric.metric.Statistics` object

The `Statistics` object contains the following properties:

- `MinValue` is a double that returns the minimum of the `Value` of the `slmetric.metric.Result` object.
- `MaxValue` is a double that returns the maximum of the `Value` of the `slmetric.metric.Result` object.
- `MeanValue` is a double that returns the mean of the `Value` of the `slmetric.metric.Result` object.
- `StandardDeviation` is a double that returns the standard deviation of the `Value` of the `slmetric.metric.Result` object.

Examples

Collect Statistics

This example shows how to create a `slmetric.Engine` object, set the analysis root, collect the block count metric, and collect statistics for the model `sldemo_fuelsys`.

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

% Specify model for metric analysis
setAnalysisRoot(metric_engine, 'Root', 'sldemo_fuelsys');

% Generate and collect model metrics
metricID = 'mathworks.metrics.SimulinkBlockCount';
execute(metric_engine, metricID);
stats = getMetricStatistics(metric_engine, metricID);
```

See Also

See Also

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

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2017a

loadConfiguration

Class: Advisor.Application

Package: Advisor

Load Model Advisor configuration

Syntax

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

Description

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

Input Arguments

app — **Application**

Advisor.Application object

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

filename — **Name of Model Advisor configuration MAT-file**

character vector

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

Example: 'MyConfiguration.mat'

Data Types: char

See Also

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot

Introduced in R2015b

mcdcinfo

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

Syntax

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

Description

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

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

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

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

Input Arguments

cvdo

`cvdata` object

ignore_descendants

Logical value specifying whether to ignore the coverage of descendant objects

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

object

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

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

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

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

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

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

mode

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

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

Output Arguments

coverage

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

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

total_outcomes

Total number of condition/decision outcomes for object

description

A structure array containing the following fields:

text

Character vector denoting whether the condition/decision is associated with a block output or Stateflow transition

condition.text

Character vector describing a condition/decision or the block port to which it applies

condition.achieved

Logical array indicating whether a condition case has been fully covered

condition.trueRslt

String representing a condition case expression that produces a true result

condition.falseRslt

String representing a condition case expression that produces a false result

Examples

Collect MCDC coverage for the `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 to collect MCDC coverage for a model:

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

See Also

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

Topics

“Modified Condition/Decision Coverage (MCDC)”

“MCDC Analysis”

Introduced in R2006b

mdltransformer

Open Model Transformer

Syntax

```
mdltransformer(model)
```

Description

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

Examples

Open Model Transformer for model

Open the Model Transformer for `rtwdemo_reusable_sys_outputs` example model:

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

- “Transform Model to Variant System”

Input Arguments

model — Model name

character vector

Model name or handle, specified as a character vector.

Data Types: `char`

See Also

Topics

“Transform Model to Variant System”

Introduced in R2016b

slmetric.metric.Metric class

Package: slmetric.metric

Abstract class for creating model metrics

Description

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

Properties

CompileContext — Compile mode

character vector

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

Example: `'PostCompile'`

Data Types: char

ComponentScope — Component scope

array of `Advisor.component.Types` enum values

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

Description — Metric description

character vector

Metric description.

Data Types: char

ID — Metric ID

character vector

Unique metric identifier.

Data Types: char

Version — Metric version number

integer

Use this property to communicate changes in your metric algorithm to the metric engine.

Data Types: uint32

Name — Name of the metric algorithm

character vector

Specify a name for the custom metric algorithm.

Data Types: char

ResultChecksumCoverage — Reuse metric data

logical

If `true`, results produced by the metric algorithm change only if the model or library source files change. If the source file and the metric `Version` have not changed, metric data is not regenerated. If `false`, each call to `slmetric.Engine.execute` collects new data for this metric and stores it in the metric repository.

Data Types: logical

AggregationMode — How the metric algorithm aggregates the metric data

character array

Specify the operation to aggregate the `slmetric.metric.Result` object properties `Value` and `Measure` across the component hierarchy. The metric algorithm outputs the aggregated values in the `slmetric.metric.Result` object properties `AggregatedValues` and `AggregatedMeasures`. Options are:

- **Sum**: Returns the sum of the `Value` property and the `Value` properties of all its children components across the component hierarchy.
- **Max**: Returns the maximum of the `Value` property and the `Value` properties of all its children components across the component hierarchy.
- **None**: No aggregation of metric values.

Data Types: char

AggregateComponentDetails — Aggregate detailed results to the component level

logical

If `true`, metric results that do not cover the full component scope are aggregated to the component level. Values and measures of the detailed results belonging to a component are summed and a new result is created that spans the complete component.

If `false`, returns the detailed results of the component. Detailed results are not aggregated.

Data Types: `logical`

Methods

`algorithm`

Specify logic for metric data analysis

See Also

See Also

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

Topics

“Create a Custom Model Metric”

“Model Metrics” on page 3-236

Introduced in R2016a

algorithm

Class: `slmetric.metric.Metric`

Package: `slmetric.metric`

Specify logic for metric data analysis

Syntax

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

Description

Specify logic for metric algorithm analysis. Custom-authored metric algorithms are not called for library links and external MATLAB file components.

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

Input Arguments

Metric — New model metric class

`slmetric.metric.Metric` object

Model metric class you are defining for a new metric.

Component — Component for metric analysis

`Advisor.component.Component` object

Instance of `Advisor.component.Component` for metric analysis.

Output Arguments

Result — Algorithm result data

Array of `slmetric.metric.Result` objects

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

Examples

Create Metric Algorithm for Nonvirtual Block Count

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

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

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

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

```
edit(className);
```

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

```
classdef nonvirtualblockcount < slmetric.metric.Metric  
    % nonvirtualblockcount calculate number of non-virtual blocks per level.  
    % BusCreator, BusSelector and BusAssign are treated as non-virtual.  
    properties  
        VirtualBlockTypes = {'Demux','From','Goto','Ground', ...  
            'GotoTagVisiblity','Mux','SignalSpecification', ...  
            'Terminator','Inport'};  
    end  
  
    methods  
        function this = nonvirtualblockcount()  
            this.ID = 'nonvirtualblockcount';  
            this.Version = 1;  
            this.CompileContext = 'None';  
            this.Description = 'Algorithm that counts nonvirtual blocks per level.';  
            this.ComponentScope = [Advisor.component.Types.Model, ...  
                Advisor.component.Types.SubSystem];  
        end  
  
        function res = algorithm(this, component)
```

```

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

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

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

isNonVirtual = true(size(blocks));

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

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

                ios_settings = {'Assign all', 'Index vector (dialog)', ...

```

```

        'Starting index (dialog)'});

    if nod == 1 && any(strcmp(ios_settings, ios))
        isNonVirtual(n) = false;
    end
    case 'Trigger'
        % Virtual when the output port is not present.
        if strcmp(get_param(blocks{n}, 'ShowOutputPort'), 'off')
            isNonVirtual(n) = false;
        end
    case 'Enable'
        % Virtual unless connected directly to an Outport block.
        isNonVirtual(n) = false;

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

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

blocks = blocks(isNonVirtual);

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

```

See Also

See Also

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

Topics

“Create a Custom Model Metric”

“Model Metrics” on page 3-236

Introduced in R2016a

Advisor.component.Component class

Package: Advisor.component

Create component for metric analysis

Description

Model component used for metric analysis. When you define a custom model metric, the component object defines the component for metric analysis.

Construction

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

Properties

ID — Component ID

character vector

Component identifier. This property is read/write.

Type — Component type

enum

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

Name — Component name

character vector

Model component name. This property is read/write.

IsLinked — Specifies if the component is linked to a library

logical

IsLinked is true if the component is linked to a library. Components of type Model, ModelBlock, ProtectedModel cannot be linked. For these properties, the IsLinked will always be true.

Methods

getPath Retrieve component path

See Also

See Also

Advisor.component.Types | slmetric.metric.Metric

Topics

“Create a Custom Model Metric”

“Model Metrics” on page 3-236

Introduced in R2016a

getPath

Class: Advisor.component.Component

Package: Advisor.component

Retrieve component path

Syntax

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

Description

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

Input Arguments

component — Component

Advisor.component.Component model object

Constructed Advisor.component.Component model object.

Output Arguments

path — Model component path

character vector

Model component path, specified as a character vector.

See Also

See Also

Advisor.component.Types

Introduced in R2016a

Advisor.component.Types class

Package: Advisor.component

Create enum class specifying component type

Description

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

Construction

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

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

See Also

See Also

`slmetric.metric.Metric` | `Advisor.component.Component`

Topics

“Create a Custom Model Metric”

“Model Metrics” on page 3-236

Introduced in R2016a

ModelAdvisor.Action class

Package: ModelAdvisor

Add actions to custom checks

Description

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

Construction

| | |
|---------------------|------------------------------|
| ModelAdvisor.Action | Add actions to custom checks |
|---------------------|------------------------------|

Methods

| | |
|----------------|----------------------------------|
| setCallbackFcn | Specify action callback function |
|----------------|----------------------------------|

Properties

| | |
|-------------|------------------------------|
| Description | Message in Action box |
| Name | Action button label |

Copy Semantics

Handle. To learn how this affects your use of the class, see Copying Objects (MATLAB) 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”

Topics

“Create Model Advisor Checks”

ModelAdvisor.Action

Class: ModelAdvisor.Action

Package: ModelAdvisor

Add actions to custom checks

Syntax

```
action_obj = ModelAdvisor.Action
```

Description

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

Note:

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.Check class

Package: ModelAdvisor

Create custom checks

Description

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

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

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

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

Construction

ModelAdvisor.Check

Create custom checks

Methods

getID

Return check identifier

setAction

Specify action for check

setCallbackFcn

Specify callback function for check

setInputParameters

Specify input parameters for check

setInputParametersLayoutGrid

Specify layout grid for input parameters

Properties

CallbackContext

Specify when to run check

CallbackHandle

Callback function handle for check

CallbackStyle

Callback function type

EmitInputParametersToReport

Display check input parameters in the Model Advisor report

Enable

Indicate whether user can enable or disable check

ID

Identifier for check

LicenseName

Product license names required to display and run check

ListViewVisible

Status of **Explore Result** button

Result

Results cell array

supportExclusion

Set to support exclusions

SupportLibrary

Set to support library models

Title

Name of check

TitleTips

Description of check

| | |
|---------|-----------------------------------|
| Value | Status of check |
| Visible | Indicate to display or hide check |

Copy Semantics

Handle. To learn how this affects your use of the class, see [Copying Objects \(MATLAB\)](#) in the [MATLAB Programming Fundamentals](#) documentation.

Examples

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

See Also

“[Model Advisor Customization](#)”

Topics

“[Create Model Advisor Checks](#)”

ModelAdvisor.Check

Class: ModelAdvisor.Check

Package: ModelAdvisor

Create custom checks

Syntax

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

Description

`check_obj = ModelAdvisor.Check(check_ID)` creates a check object, `check_obj`, and assigns it a unique identifier, `check_ID`. `check_ID` must remain constant.

To display checks in the Model Advisor tree, checks must have an associated `ModelAdvisor.Task` or `ModelAdvisor.Root` object.

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.FactoryGroup class

Package: ModelAdvisor

Define subfolder in **By Task** folder

Description

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

Construction

ModelAdvisor.FactoryGroup

Define subfolder in **By Task** folder

Methods

addCheck

Add check to folder

Properties

Description

Description of folder

DisplayName

Name of folder

ID

Identifier for folder

MAObj

Model Advisor object

Copy Semantics

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.FactoryGroup

Class: ModelAdvisor.FactoryGroup

Package: ModelAdvisor

Define subfolder in **By Task** folder

Syntax

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

Description

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.FormatTemplate class

Package: ModelAdvisor

Template for formatting Model Advisor analysis results

Description

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

- Table
- List

Construction

| | |
|--|---|
| <code>ModelAdvisor.FormatTemplate</code> | Construct template object for formatting Model Advisor analysis results |
|--|---|

Methods

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

| | |
|---------------|--------------------|
| setTableInfo | Add data to table |
| setTableTitle | Add title to table |

Copy Semantics

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

Examples

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

```
function sl_customization(cm)

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

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

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

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

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

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

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

```

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

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

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

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

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

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

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

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

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

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

See Also

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

Passed

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

Blocks in the Model (setTableTitle method)

| Index (setColTitles method) | Block Name (setColTitles method) |
|-----------------------------|----------------------------------|
| 1 | model/Constant |
| 2 | model/Constant1 |
| 3 | model/Gain |
| 4 | model/Product |
| 5 | model/Out1 |

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

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

See Also

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

Passed

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

- [model](#)
- [model/Constant](#)
- [model/Constant1](#)
- [model/Gain](#)
- [model/Product](#)
- [model/Out1](#)

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

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”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.FormatTemplate

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Construct template object for formatting Model Advisor analysis results

Syntax

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

Description

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

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

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

Examples

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

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.Group class

Package: ModelAdvisor

Define custom folder

Description

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

Construction

`ModelAdvisor.Group`

Define custom folder

Methods

`addGroup`

Add subfolder to folder

`addProcedure`

Add procedure to folder

`addTask`

Add task to folder

Properties

`Description`

Description of folder

`DisplayName`

Name of folder

`ID`

Identifier for folder

`MAObj`

Model Advisor object

Copy Semantics

Handle. To learn how this affects your use of the class, see [Copying Objects \(MATLAB\)](#) in the [MATLAB Programming Fundamentals](#) documentation.

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.Group

Class: ModelAdvisor.Group

Package: ModelAdvisor

Define custom folder

Syntax

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

Description

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.Image class

Package: ModelAdvisor

Include image in Model Advisor output

Description

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

Construction

`ModelAdvisor.Image`

Include image in Model Advisor output

Methods

`setHyperlink`

Specify hyperlink location

`setImageSource`

Specify image location

Copy Semantics

Handle. To learn how this affects your use of the class, see [Copying Objects \(MATLAB\)](#) in the [MATLAB Programming Fundamentals](#) documentation.

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.Image

Class: ModelAdvisor.Image

Package: ModelAdvisor

Include image in Model Advisor output

Syntax

```
object = ModelAdvisor.Image
```

Description

`object = ModelAdvisor.Image` creates a handle to an image object, `object`, that the Model Advisor displays in the output. The Model Advisor supports many image formats, including, but not limited to, JPEG, BMP, and GIF.

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.InputParameter class

Package: ModelAdvisor

Add input parameters to custom checks

Description

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

Construction

| | |
|--|---------------------------------------|
| <code>ModelAdvisor.InputParameter</code> | Add input parameters to custom checks |
|--|---------------------------------------|

Methods

| | |
|-------------------------|---|
| <code>setColSpan</code> | Specify number of columns for input parameter |
| <code>setRowSpan</code> | 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 \(MATLAB\)](#) in the MATLAB Programming Fundamentals documentation.

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.InputParameter

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Add input parameters to custom checks

Syntax

```
input_param = ModelAdvisor.InputParameter
```

Description

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

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

Examples

Note: The following example is a fragment of code from the `sl_customization.m` file for the example model, `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”

Topics

“Create Model Advisor Checks”

ModelAdvisor.LineBreak class

Package: ModelAdvisor

Insert line break

Description

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

Construction

`ModelAdvisor.LineBreak`

Insert line break

Copy Semantics

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.LineBreak

Class: ModelAdvisor.LineBreak

Package: ModelAdvisor

Insert line break

Syntax

ModelAdvisor.LineBreak

Description

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

Examples

Add a line break between two lines of text:

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.List class

Package: ModelAdvisor

Create list class

Description

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

Construction

`ModelAdvisor.List`

Create list class

Methods

`addItem`

Add item to list

`setType`

Specify list type

Copy Semantics

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.List

Class: ModelAdvisor.List

Package: ModelAdvisor

Create list class

Syntax

```
list = ModelAdvisor.List
```

Description

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.ListViewParameter class

Package: ModelAdvisor

Add list view parameters to custom checks

Description

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

Construction

| | |
|--------------------------------|---|
| ModelAdvisor.ListViewParameter | Add list view parameters to custom checks |
|--------------------------------|---|

Properties

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

Copy Semantics

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

Examples

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

```
mdladvObj = Simulink.ModelAdvisor.getModelAdvisor(system);  
mdladvObj.setCheckResultStatus(true);  
  
% define list view parameters  
myLVParam = ModelAdvisor.ListViewParameter;  
myLVParam.Name = 'Invalid font blocks'; % the name appeared at pull down filter  
myLVParam.Data = get_param(searchResult, 'object');  
myLVParam.Attributes = {'FontName'}; % name is default property  
mdladvObj.setListViewParameters({myLVParam});
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.ListViewParameter

Class: ModelAdvisor.ListViewParameter

Package: ModelAdvisor

Add list view parameters to custom checks

Syntax

```
lv_param = ModelAdvisor.ListViewParameter
```

Description

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

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

See Also

“Model Advisor Customization”

Topics

“Define Model Advisor Result Explorer Views”

“Create Model Advisor Checks”

“Batch-Fix Warnings or Failures” (Simulink)

“Customization Example”

“getListViewParameters” (Simulink)

“setListViewParameters” (Simulink)

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”

See Also

`ModelAdvisor.run`

Topics

“Archive and View Results”

Introduced in R2010b

ModelAdvisor.Paragraph class

Package: ModelAdvisor

Create and format paragraph

Description

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

Construction

`ModelAdvisor.Paragraph`

Create and format paragraph

Methods

`addItem`

Add item to paragraph

`setAlign`

Specify paragraph alignment

Copy Semantics

Handle. To learn how this affects your use of the class, see [Copying Objects \(MATLAB\)](#) 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”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.Paragraph

Class: ModelAdvisor.Paragraph

Package: ModelAdvisor

Create and format paragraph

Syntax

```
para_obj = ModelAdvisor.Paragraph
```

Description

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.Procedure class

Package: ModelAdvisor

Define custom procedures

Description

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

Construction

`ModelAdvisor.Procedure`

Define custom procedures

Properties

Description

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

Default: '' (empty character vector)

Name

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

Default: '' (empty character vector)

ID

Specifies a permanent, unique identifier for the procedure.

Note:

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

MAObj

Specifies a handle to the current Model Advisor object.

Methods

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

Copy Semantics

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

See Also

“Model Advisor Customization”

Topics

“Create Procedures”

“Create Procedural-Based Configurations”

“Create Model Advisor Checks”

ModelAdvisor.Procedure

Class: ModelAdvisor.Procedure

Package: ModelAdvisor

Define custom procedures

Syntax

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

Description

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Procedures”

“Create Procedural-Based Configurations”

“Create Model Advisor Checks”

ModelAdvisor.Root class

Package: ModelAdvisor

Identify root node

Description

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

Construction

`ModelAdvisor.Root`

Identify root node

Methods

`publish`

Publish object in Model Advisor root

`register`

Register object in Model Advisor root

Copy Semantics

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.Root

Class: ModelAdvisor.Root

Package: ModelAdvisor

Identify root node

Syntax

```
root_obj = ModelAdvisor.Root
```

Description

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.run

Package: ModelAdvisor

Run Model Advisor checks on systems

Syntax

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

Description

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

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

Input Arguments

SysList

Cell array of systems to run.

CheckIDList

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

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

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

FileName

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

Name-Value Pair Arguments

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

'DisplayResults'

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

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

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

Default: 'Summary'

'Force'

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

Default: 'Off'

'ParallelMode'

Setting **ParallelMode** to 'On' runs the Model Advisor in parallel mode if you have a Parallel Computing Toolbox license and a multicore machine. The Parallel Computing Toolbox does not support 32-bit Windows® machines. Each parallel process runs checks

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

Default: 'Off'

'TempDir'

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

Default: 'Off'

'ShowExclusions'

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

Default: 'On'

Output Arguments

SysResultObjArray

Cell array of ModelAdvisor.SystemResult objects, one for each model specified in SysList. Each ModelAdvisor.SystemResult object contains an array of CheckResultObj objects. Save SysResultObjArray to review results at a later time without having to rerun the Model Advisor (see “Save and Load Process for Objects” (MATLAB)).

CheckResultObj

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

Examples

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

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

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

Runs the Model Advisor configuration file `slvndemo_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);
```

Tutorials

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

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.

Alternatives

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

See Also

ModelAdvisor.summaryReport | view | viewReport |
ModelAdvisor.lookupCheckID

Topics

“Checking Systems Programmatically”

“Check Multiple Systems in Parallel”

“Create a Function for Checking Multiple Systems in Parallel”

“Automate Model Advisor Check Execution”

“Find Check IDs”

“Organize Checks and Folders Using the Model Advisor Configuration Editor”

“Save and Load Process for Objects” (MATLAB)

Introduced in R2010b

ModelAdvisor.summaryReport

Package: ModelAdvisor

Open Model Advisor Command-Line Summary report

Syntax

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

Description

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

Input Arguments

SysResultObjArray

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

Examples

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

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

Tutorials

- [“Checking Systems Programmatically”](#)
- [“Check Multiple Systems in Parallel”](#)
- [“Create a Function for Checking Multiple Systems in Parallel”](#)

Alternatives

[“View Results in Model Advisor Command-Line Summary Report”](#)

See Also

`ModelAdvisor.run | view | viewReport`

Topics

[“Checking Systems Programmatically”](#)

[“Check Multiple Systems in Parallel”](#)

[“Create a Function for Checking Multiple Systems in Parallel”](#)

[“Automate Model Advisor Check Execution”](#)

[“Archive and View Model Advisor Run Results”](#)

Introduced in R2010b

ModelAdvisor.Table class

Package: ModelAdvisor

Create table

Description

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

Construction

`ModelAdvisor.Table`

Create table

Methods

`getEntry`

Get table cell contents

`setColHeading`

Specify table column title

`setColHeadingAlign`

Specify column title alignment

`setColHeadingValign`

Specify column title vertical alignment

`setColWidth`

Specify column widths

`setEntries`

Set contents of table

`setEntry`

Add cell to table

`setEntryAlign`

Specify table cell alignment

`setEntryValign`

Specify table cell vertical alignment

`setHeading`

Specify table title

`setHeadingAlign`

Specify table title alignment

`setRowHeading`

Specify table row title

`setRowHeadingAlign`

Specify table row title alignment

`setRowHeadingValign`

Specify table row title vertical alignment

Copy Semantics

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.Table

Class: ModelAdvisor.Table

Package: ModelAdvisor

Create table

Syntax

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

Description

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

Examples

Create two table objects

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

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

Create table with five rows and five columns

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

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

```
% ModelAdvisor.Table example  
  
matrixData = rand(5,5) * 10^5;
```

```

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

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

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

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

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

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

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

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

```

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

See Also

[ModelAdvisor.Table.setColHeading](#) |
[ModelAdvisor.Table.setColHeadingAlign](#) |

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

Topics

“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 (MATLAB) 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”

Topics

“Create Model Advisor Checks”

ModelAdvisor.Task

Class: ModelAdvisor.Task

Package: ModelAdvisor

Define custom tasks

Syntax

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

Description

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

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

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

Examples

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

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

ModelAdvisor.Text class

Package: ModelAdvisor

Create Model Advisor text output

Description

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

Construction

`ModelAdvisor.Text`

Create Model Advisor text output

Methods

`setBold`

Specify bold text

`setColor`

Specify text color

`setHyperlink`

Specify hyperlinked text

`setItalic`

Italicize text

`setRetainSpaceReturn`

Retain spacing and returns in text

`setSubscript`

Specify subscripted text

`setSuperscript`

Specify superscripted text

`setUnderlined`

Underline text

Copy Semantics

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

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

ModelAdvisor.Text

Class: ModelAdvisor.Text

Package: ModelAdvisor

Create Model Advisor text output

Syntax

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

Description

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

Input Arguments

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

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

Output Arguments

text The text object you create

Examples

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

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check 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.

.

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

Example: `'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:

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

Data Types: double

description — Textual description of coverage outcomes

structure array

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

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

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

Data Types: struct

See Also

See Also

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

Topics

“Saturate on Integer Overflow Coverage”

Introduced in R2013a

relationalboundaryinfo

Retrieve relational boundary coverage from `cvdata` object

Syntax

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

`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.relationalop = 1;
```

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

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

Obtain relational boundary coverage results for the Saturation block in `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

```

```

end

ans =

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

ans =

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

.

```

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 |

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

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

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

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

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

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

mode — The `mode` argument specifies the simulation mode for coverage
character vector

Valid values for `mode` include the following:

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

ignore_descendants — Preference to ignore coverage of descendant objects

0 (default) | 1

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

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

Data Types: `logical`

Output Arguments

coverage — Relational boundary coverage results for object

numerical vector

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

| | |
|-------------------------------|--|
| <code>covered_outcomes</code> | Number of relational boundary outcomes satisfied for <code>object</code> |
| <code>total_outcomes</code> | Total number of relational boundary 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 relational boundary coverage is collected, the structure array contains the following fields:

| | | | | | | | |
|-------------------------|---|-----------------|--|------------------|---|-------------|---------------------------------|
| isFiltered | 0 if the model component specified by object is not excluded from coverage recording. 1 if the model component specified by object is excluded from coverage recording. For more information about excluding objects from coverage, see “Coverage Filtering”. | | | | | | |
| decision.text | Character vector of the form: <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. | | | | | | |
| decision.outcome | Structure array containing two fields for each coverage outcome: <table> <tr> <td>isActive</td> <td>Boolean variable. If this variable is false, it indicates that decisions were not evaluated during simulation due to variable signal size.</td> </tr> <tr> <td>execCount</td> <td>Number of times <i>op_1-op_2</i> fell in the range described by text</td> </tr> <tr> <td>text</td> <td>The range around the relational</td> </tr> </table> | isActive | Boolean variable. If this variable is false , it indicates that decisions were not evaluated during simulation due to variable signal size. | execCount | Number of times <i>op_1-op_2</i> fell in the range described by text | text | The range around the relational |
| isActive | Boolean variable. If this variable is false , it indicates that decisions were not evaluated during simulation due to variable signal size. | | | | | | |
| execCount | Number of times <i>op_1-op_2</i> fell in the range described by text | | | | | | |
| text | The range around the relational | | | | | | |

boundary considered for coverage. For more information, see “Relational Boundary”.

`decision.isFiltered`

0 if the model component specified by `object` is not excluded from coverage recording. 1 if the model component specified by `object` is excluded from coverage recording. For more information about excluding objects from coverage, see “Coverage Filtering”.

`decision.filterRationale`

Rationale for filtering the model component specified by `object`, if `object` is excluded from coverage and a rationale is specified. For more information about excluding objects from coverage, see “Coverage Filtering”.

Data Types: `struct`

See Also

See Also

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

Topics

“Relational Boundary Coverage”

Introduced in R2014b

publish

Class: ModelAdvisor.Root

Package: ModelAdvisor

Publish object in Model Advisor root

Syntax

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

Description

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

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

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

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

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

Examples

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

See Also

Topics

“Define Where Custom Checks Appear”

“Define Where Tasks Appear”

“Define Where Custom Folders Appear”

refresh_customizations

Class: Advisor.Manager

Package: Advisor

Refresh Model Advisor check information cache

Syntax

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

Description

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

Alternatives

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

See Also

Topics

“Create and Add Custom Checks - Basic Examples”

“Create Check for Model Configuration Parameters”

Introduced in R2016b

register

Class: ModelAdvisor.Root

Package: ModelAdvisor

Register object in Model Advisor root

Syntax

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

Description

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

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

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

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

Examples

```
mdladvRoot = ModelAdvisor.Root;  
  
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.DisplayName='Example task with input parameter and auto-fix ability';  
MAT1.setCheck('com.mathworks.sample.Check1');  
mdladvRoot.register(MAT1);  
  
MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');  
MAT2.DisplayName='Example task 2';
```

```
MAT2.setCheck('com.mathworks.sample.Check2');  
mdladvRoot.register(MAT2);  
  
MAT3 = ModelAdvisor.Task('com.mathworks.sample.TaskSample3');  
MAT3.DisplayName='Example task 3';  
MAT3.setCheck('com.mathworks.sample.Check3');  
mdladvRoot.register(MAT3)
```

rmi

Interact programmatically with Requirements Management Interface

Syntax

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

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

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

rmi setup
rmi register linktypename
rmi unregister linktypename
rmi linktypelist

number_problems = rmi('checkdoc')
```



```
number_problems = rmi('checkdoc', docName)
rmi('check', matlabFilePath)
rmi('check', dictionaryFile)

rmi('doorssync', model)

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

Description

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

`guidStr = rmi('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('report', dictionaryFile)` generates a Requirements Traceability report in HTML format for the Simulink data dictionary specified by `dictionaryFile`.

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

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

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

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

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

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

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

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

`rmi('check', dictionaryFile)` checks consistency of traceability links associated with the Simulink data dictionary `dictionaryFile`, and opens an HTML report in the MATLAB Web browser.

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

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

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

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

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

Examples

Requirements Links Management in Example Model

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

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

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

Change the description of the requirement link.

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

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

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

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

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

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

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

Requirements Traceability Report for Example Model

Create HTML report of requirements traceability data in example model.

Create an HTML requirements report for the `slvndemo_fuelsys_htmreq` example model.

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

The MATLAB Web browser opens, showing the report.

Labels for Requirements Links to IBM Rational DOORS

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

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

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

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

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

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

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

Input Arguments

model — Simulink or Stateflow model with which requirements can be associated

name | handle

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

Example: 'slvndemo_officereq'

Data Types: char

object — Model object with which requirements can be associated

name | handle

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

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

Data Types: char

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

name | handle

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

Data Types: char

group_idx — Signal Builder group index

integer

Signal Builder group index, specified as a scalar.

Example: 2

Data Types: char

matlabFilePath — MATLAB code file with requirements traceability associations

path

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

Example:

Data Types: char

dictionaryFile — Simulink data dictionary with requirements traceability associations

character vector

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

Example:

Data Types: char

guidStr — Globally unique identifier for model object

character vector

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

Example: `GIDa_59e165f5_19fe_41f7_abc1_39c010e46167`

Data Types: char

index — Index number of requirement linked to model object

integer

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

docName — Requirements document in external application

file name | path

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

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

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

label — Label for links to requirements in IBM Rational DOORS

character vector

Example:

Data Types: char

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

character vector

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

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

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

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

Data Types: char

moduleID — IBM Rational DOORS module

DOORS module ID

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

Example:

Data Types: char

objectID — IBM Rational DOORS object

DOORS object ID

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

Example:

Data Types: char

Output Arguments

reqlinks — Requirement links data

struct

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

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

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

linked Boolean value specifying whether the requirement link is accessible for report generation and highlighting:
 1 (default). Highlight model object and include requirement link in reports.
 0

description Character vector describing the requirement

keywords Optional character vector supplementing description

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

cmdStr — Command used to navigate to model object

character vector

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

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

titleStr — Textual description of model object with requirements links

character vector

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

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

guidStr — Globally unique identifier for model object

character vector

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

Example: `GIDa_59e165f5_19fe_41f7_abc1_39c010e46167`

dialog — Requirements dialog box for model object

handle

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

number_problems — Total count of invalid links detected in external document

integer

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

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

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

integer

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

See Also

See Also

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

Topics

“Requirements Management Interface Setup”

“Maintenance of Requirements Links”

Introduced in R2006b

rmidata.export

Move requirements traceability data to external .req file

Syntax

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

Description

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

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

Input Arguments

model

Name or handle of a Simulink model

Output Arguments

total_linked

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

total_links

Integer indicating the total number of requirements links in the model

Examples

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

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

See Also

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

Topics

“Specify Storage for Requirements Links”

“Requirements Link Storage”

Introduced in R2011b

rmimap.map

Associate externally stored requirements traceability data with model

Syntax

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

Description

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

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

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

Input Arguments

model

Name, handle, or full path for a Simulink model

reqts_file

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

Alternatives

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

- 1 Open the model.

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

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

- 3 Browse to the `.req` file that contains the requirements links.
- 4 Click **OK**.

Examples

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

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

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

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

See Also

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

Topics

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

Introduced in R2015a

rmidata.save

Save requirements traceability data in external .req file

Syntax

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

Description

`rmidata.save(model)` saves requirements traceability data for a model in an external .req file. The model must be configured to store requirements traceability data externally. This function is equivalent to **Analysis > Requirements > Save Links** in the Simulink Editor.

Examples

Create New Requirement Link and Save Externally

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

Open the example model, `slvndemo_powerwindowController`.

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

Specify that the model store requirements data externally.

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

Create a new requirements link structure.

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

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


```
newReqLink.doc = [matlabroot '\toolbox\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.

.

Input Arguments

model — Name or handle of model with requirements links

character vector | handle

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

If you have a new model with no existing requirements links, configure it for external storage as described in “Specify Storage for Requirements Links”. You can also use the `rmipref` command to specify storage settings.

If you have an existing model with internally stored requirements traceability data, convert that data to external storage as described in “Move Internally Stored Requirements Links to External Storage”. You can also use the `rmidata.export` command to convert existing requirements traceability data to external storage.

Example: `'slvnvdemo_powerwindowController'`

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

See Also

See Also

`rmidata.export` | `rmimap.map`

Topics

“Requirements Link Storage”

Introduced in R2013b

rmidocrename

Update model requirements document paths and file names

Syntax

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

Description

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

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

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

Examples

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

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

Alternatives

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

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

See Also

rmi

Introduced in R2009b

slrequirements

Synchronize model with DOORS surrogate module

Syntax

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

Description

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

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

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

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

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

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

Input Arguments

model_name

Name or handle of a Simulink model

settings

Structure with the following fields.

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

| Field | Description |
|-------------|---|
| purgeDoors | Removes unmatched links in the surrogate module (ignored if <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 = slrequirements('doorssync', 'slvndemo_fuelsys_officereq', ...
```

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

Alternatives

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

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

See Also

`rmi`

Topics

“Synchronize a Simulink Model to Create a Surrogate Module”

“Resynchronize DOORS Surrogate Module to Reflect Model Changes”

Introduced in R2016a

rmiobjnavigate

Navigate to model objects using unique Requirements Management Interface identifiers

Syntax

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

Description

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

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

Input Arguments

modelPath

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

guId

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

grpNum

Integer indicating a signal group number in a Signal Builder block

Examples

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

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

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

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

See Also

`rmi`

Topics

“Use the `rmiobjnavigate` Function”

Introduced in R2010b

rmipref

Get or set RMI preferences stored in `prefdir`

Syntax

```
rmipref
```

```
currentVal = rmipref(prefName)
```

```
previousVal = rmipref(Name,Value)
```

Description

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

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

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

Examples

References to Simulink Model in External Requirements Documents

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

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

```
currentVal = rmipref('ModelPathReference')
```

The default value of the 'ModelPathReference' preference is 'none'.

```
currentVal =  
  
none
```

This default value specifies that the RMI uses only the model file name in references to your model that it creates in external requirements documents.

Automatic Application of User Tags to Selection-Based Requirements Links

Configure the RMI to automatically apply a specified list of user tag keywords to new selection-based requirements links that you create.

Specify that the user tags `design` and `reqts` apply to new selection-based requirements links that you create.

```
previousVal = rmipref('SelectionLinkTag', 'design,reqts')
```

When you specify a new value for an RMI preference, `rmipref` returns the previous value of that RMI preference. In this case, `previousVal` is an empty character vector, the default value of the 'SelectionLinkTag' preference.

```
previousVal =  
''
```

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

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

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

```
currentVal =  
  
design,reqts
```

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

Internal Storage of Requirements Traceability Data

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

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

If you would like to embed requirements traceability data in the model file, set the `'StoreDataExternally'` preference to 0.

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

When you specify a new value for an RMI preference, `rmipref` returns the previous value of that RMI preference. By default, the RMI stores requirements links data externally in a separate `.req` file, so the previous value of this preference was 1.

```
previousVal =  
    1
```

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

```
currentVal = rmipref('StoreDataExternally')  
currentVal =  
    0
```

Input Arguments

prefName — RMI preference name

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

RMI preference name, specified as the corresponding **Name** character vector listed in “Name-Value Pair Arguments” on page 1-265.

Name-Value Pair Arguments

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

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

'BiDirectionalLinking' — Bidirectional selection linking preference

`false` (default) | `true`

Bidirectional selection linking preference, specified as a logical value.

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

Data Types: `logical`

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

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

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

| Value | Document reference contains... |
|------------------------------|--|
| <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 values.

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

Data Types: char

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

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

Data Types: char

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

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

Data Types: logical

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

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

Data Types: char

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

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

Data Types: char

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

false (default) | true

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

Data Types: logical

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

false (default) | true

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

Data Types: logical

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

empty (default) | false | true

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

Data Types: logical

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

false (default) | true

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

Data Types: logical

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

true (default) | false

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

Data Types: logical

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

false (default) | true

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

Data Types: logical

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

false (default) | true

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

Data Types: logical

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

false (default) | true

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

Data Types: `logical`

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

`false` (default) | `true`

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

Data Types: `logical`

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

`false` (default) | `true`

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

Data Types: `logical`

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

`true` (default) | `false`

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

Data Types: `logical`

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

`true` (default) | `false`

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

Data Types: logical

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

true (default) | false

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

Data Types: logical

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

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

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

Data Types: char

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

false (default) | true

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

Data Types: logical

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

false (default) | true

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

Data Types: `logical`

'CustomSettings' — Preference for storing custom settings

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

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

Data Types: `struct`

Output Arguments

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

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

Current value of the RMI preference specified by `prefName`. RMI preference names and their associated possible values are listed in “Name-Value Pair Arguments” on page 1-265.

`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 1-265.

See Also

See Also

`rmi`

Topics

“Requirements Settings”

Introduced in R2013a

rmiref.insertRefs

Insert links to models into requirements documents

Syntax

```
[total_links, total_matches, total_inserted] = rmiref.insertRefs(model_name, doc_type)
```

Description

`[total_links, total_matches, total_inserted] = rmiref.insertRefs(model_name, doc_type)` inserts ActiveX controls into the open, active requirements document of type `doc_type`. These controls correspond to links from `model_name` to the document. With these controls, you can navigate from the requirements document to the model.

Input Arguments

model_name

Name or handle of a Simulink model

doc_type

A character vector that indicates the requirements document type:

- 'word'
- 'excel'

Examples

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

- 1 Open the example model:

```
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`

Introduced in R2011a

rmiref.removeRefs

Remove links to models from requirements documents

Syntax

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

Description

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

Input Arguments

`doc_type`

A character vector that indicates the requirements document type:

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

Examples

Remove the links in this example requirements document:

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

See Also

`rmiref.insertRefs`

Introduced in R2011a

rmitag

Manage user tags for requirements links

Syntax

```
rmitag(model, 'list')
rmitag(model, 'add', tag)
rmitag(model, 'add', tag, doc_pattern)
rmitag(model, 'delete', tag)
rmitag(model, 'delete', tag, doc_pattern)
rmitag(model, 'replace', tag, new_tag)
rmitag(model, 'replace', tag, new_tag, doc_pattern)
rmitag(model, 'clear', tag)
rmitag(model, 'clear', tag, doc_pattern)
```

Description

`rmitag(model, 'list')` lists all user tags in `model`.

`rmitag(model, 'add', tag)` adds `tag` as a user tag for all requirements links in `model`.

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

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

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

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

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

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

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

Input Arguments

model

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

tag

Character vector specifying user tag for requirements links.

doc_pattern

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

new_tag

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

Examples

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

```
open_system('slvndemo_fuelsys_officereq');  
rmitag(gcs, 'add', 'tmp tag');
```

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');
```

See Also

`rmi` | `rmidocrename`

Topics

“User Tags and Requirements Filtering”

Introduced in R2010a

RptgenRMI.doorsAttribs

IBM Rational DOORS attributes in requirements report

Syntax

RptgenRMI.doorsAttribs (action,attribute)

Description

RptgenRMI.doorsAttribs (action,attribute) specifies which DOORS object attributes to include in the generated requirements report.

Input Arguments

action

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

| Value | Description |
|-----------|---|
| 'default' | Restore the default settings for the DOORS system attributes to include in the report. The default configuration includes the Object Heading and Object Text attributes, and all other attributes, except: <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. |

| Value | Description |
|------------|---|
| 'type' | <p>Include or omit groups of DOORS attributes from the report.</p> <p>If you specify 'type' for the first argument, valid values for the second argument are:</p> <ul style="list-style-type: none"> • '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

Character vector that qualifies the `action` argument.

Output Arguments

result

- True if `RptgenRMI.doorsAttribs` modifies the current settings.
- For `RptgenRMI.doorsAttribs('show')`, this argument is a cell array of character vectors that indicate which DOORS attributes to include in the requirements report, for example:

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

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

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

Examples

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

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

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

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

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

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

Include empty system attributes in the requirements report:

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

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

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

See Also

rmi

Introduced in R2011b

run

Class: Advisor.Application

Package: Advisor

Run Model Advisor analysis on model components

Syntax

```
run(app)
```

Description

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

Examples

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

```
% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app, 'Root', RootModel);

% Run Model Advisor analysis
run(app);
```

Input Arguments

app — Application

Advisor.Application object

Advisor.Application object, created by Advisor.Manager.createApplication

See Also

See Also

`Advisor.Manager.createApplication` | `Advisor.Application.setAnalysisRoot`

Introduced in R2015b

selectCheckInstances

Class: `Advisor.Application`

Package: `Advisor`

Select check instances to use in Model Advisor analysis

Syntax

```
selectCheckInstances(app)
selectCheckInstances(app,Name,Value)
```

Description

You can select check instances to use in a Model Advisor analysis. A check instance is an instantiation of a `ModelAdvisor.Check` object in the Model Advisor configuration. When you change the Model Advisor configuration, the check instance ID might change. To obtain the check instance ID, use the `getCheckInstanceIDs` method.

`selectCheckInstances(app)` selects all check instances to use for Model Advisor analysis.

`selectCheckInstances(app,Name,Value)` selects check instances specified by `Name,Value` pair arguments to use for Model Advisor analysis.

Input Arguments

app — Application

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

Name-Value Pair Arguments

Specify optional comma-separated pairs of `Name,Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside single

quotes (' '). You can specify several name and value pair arguments in any order as Name1,Value1,...,NameN,ValueN.

'IDs' — Check instance IDs

cell array

Select check instances to use in Model Advisor analysis, as specified as a cell array of IDs

Data Types: cell

Examples

Select All Check Instances to Use in Model Advisor Analysis

This example shows how to set the root model, create an `Application` object, set root analysis, and select all check instances for Model Advisor analysis.

```
% Set root model to sldemo_mdref_basic model
RootModel='sldemo_mdref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);

% Select all checks
selectCheckInstances(app);
```

Select Check Instance for Model Advisor Analysis Using Instance ID

This example shows how to set the root model, create an `Application` object, set root analysis, and select a check using instance ID.

```
% Set root model to sldemo_mdref_basic model
RootModel='sldemo_mdref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app,'Root',RootModel);
```

```
% Select "Identify unconnected lines, input ports, and output  
% ports" check using check instance ID  
instanceID = getCheckInstanceIDs(app,'mathworks.design.UnconnectedLinesPorts');  
checkinstanceID = instanceID(1);  
selectCheckInstances(app,'IDs',checkinstanceID);
```

See Also

See Also

[Advisor.Manager.createApplication](#) | [Advisor.Application.setAnalysisRoot](#) |
[Advisor.Application.getCheckInstanceIDs](#) | [Advisor.Application.deselectCheckInstances](#)

Introduced in R2015b

selectComponents

Class: Advisor.Application

Package: Advisor

Select model components for Model Advisor analysis

Syntax

```
selectComponents(app)
```

```
selectComponents(app,Name,Value)
```

Description

You can select model components for Model Advisor analysis. A model component is a model in the system hierarchy. Models that the root model references and that `Advisor.Application.setAnalysisRoot` specifies are model components. By default, all components are selected.

`selectComponents(app)` includes all components for Model Advisor analysis.

`selectComponents(app,Name,Value)` includes model components specified by `Name,Value` pair arguments for Model Advisor analysis.

Input Arguments

app — Application

Advisor.Application object

Advisor.Application object, created by `Advisor.Manager.createApplication`

Name-Value Pair Arguments

Specify optional comma-separated pairs of `Name,Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside single

quotes (' '). You can specify several name and value pair arguments in any order as Name1,Value1,...,NameN,ValueN.

'IDs' — Component IDs

cell array

Components to select for Model Advisor analysis, as specified by a cell array of IDs

Data Types: cell

'HierarchicalSelection' — Select component and component children

false (default) | true

Select components specified by IDs and component children from Model Advisor analysis.

Data Types: logical

Examples

Include All Components in Model Advisor Analysis

This example shows how to set the root model, create an `Application` object, set root analysis, and include model components in Model Advisor analysis.

```
% Set root model to sldemo_mdref_basic model
RootModel='sldemo_mdref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app, 'Root', RootModel);

% Select all components
selectComponents(app);
```

Select Components for Model Advisor Analysis Using IDs

This example shows how to set the root model, create an `Application` object, set root analysis, and include model components using IDs.

```
% Set root model to sldemo_mdref_basic model
RootModel='sldemo_mdref_basic';
```

```
% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app, 'Root', RootModel);

% Select component using IDs
selectComponents(app, 'IDs', RootModel);
```

See Also

See Also

Advisor.Manager.createApplication | Advisor.Application.setAnalysisRoot |
Advisor.Application.deselectComponents

Introduced in R2015b

setAction

Class: ModelAdvisor.Check

Package: ModelAdvisor

Specify action for check

Syntax

```
setAction(check_obj, action_obj)
```

Description

`setAction(check_obj, action_obj)` returns the action object `action_obj` to use in the check `check_obj`. The `setAction` method identifies the action you want to use in a check.

See Also

`ModelAdvisor.Action` | “Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setAlign

Class: ModelAdvisor.Paragraph

Package: ModelAdvisor

Specify paragraph alignment

Syntax

```
setAlign(paragraph, alignment)
```

Description

`setAlign(paragraph, alignment)` specifies the alignment of text. Possible values are:

- 'left' (default)
- 'right'
- 'center'

Examples

```
report_paragraph = ModelAdvisor.Paragraph;  
setAlign(report_paragraph, 'center');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setAnalysisRoot

Class: Advisor.Application

Package: Advisor

Specify model hierarchy for Model Advisor analysis

Syntax

```
setAnalysisRoot(app, 'Root', root)
setAnalysisRoot(app, 'Root', root, Name, Value)
```

Description

Specify the model hierarchy for an `Application` object analysis.

`setAnalysisRoot(app, 'Root', root)` specifies the analysis root.

`setAnalysisRoot(app, 'Root', root, Name, Value)` specifies the analysis root using `Name, Value` options.

Input Arguments

app — **Application**

`Advisor.Application` object

`Advisor.Application` object, created by `Advisor.Manager.createApplication`

'Root', root — **Name, Value argument specifying model or subsystem path**

character vector

Comma-separated `Name, Value` argument specifying model or subsystem path

Name-Value Pair Arguments

Specify optional comma-separated pairs of `Name, Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside single

quotes (' '). You can specify several name and value pair arguments in any order as Name1,Value1,...,NameN,ValueN.

'RootType' — Analysis root

Model (default) | Subsystem

Examples

Specify Root Model as Analysis Root

This example shows how to set the root model, create an `Application` object, and set the root analysis.

```
% Set root model to sldemo_mdref_basic model
RootModel='sldemo_mdref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app, 'Root', RootModel);
```

Specify Subsystem as Analysis Root

This example shows how to set the root model, create an `Application` object, and specify a subsystem as the analysis root.

```
% Set root model to sldemo_mdref_basic model
RootModel='sldemo_mdref_basic';

% Create an Application object
app = Advisor.Manager.createApplication();

% Set the Application object root analysis
setAnalysisRoot(app, 'Root', 'sldemo_mdref_basic/CounterA', 'RootType', 'Subsystem');
```

See Also

See Also

`Advisor.Manager.createApplication`

Introduced in R2015b

setAnalysisRoot

Class: slmetric.Engine

Package: slmetric

Specify model or subsystem for metric analysis

Syntax

```
setAnalysisRoot(metric_engine, 'Root', root)
setAnalysisRoot(metric_engine, 'Root', root, Name, Value)
```

Description

Specify the model or subsystem for `slmetric.Engine` metric object analysis.

`setAnalysisRoot(metric_engine, 'Root', root)` specifies the metric analysis root.

`setAnalysisRoot(metric_engine, 'Root', root, Name, Value)` specifies the metric analysis root by using `Name, Value` pairs.

Input Arguments

metric_engine — Collects and accesses metric data

`slmetric.Engine` object

When you call `slmetric.Engine.execute`, `metric_engine` collects metric data for all MathWorks metrics or for the specified `MetricIDs`. Calling `slmetric.Engine.getMetrics` accesses the collected metric data in `metric_engine`.

'Root' — Name, Value argument specifying model or subsystem path

character vector

Comma-separated `Name, Value` argument specifying model or subsystem path.

Name-Value Pair Arguments

Specify optional comma-separated pairs of `Name`, `Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside single quotes (' '). You can specify several name and value pair arguments in any order as `Name1, Value1, ..., NameN, ValueN`.

'RootType' — Type of model component for metric analysis
Model (default) | Subsystem

Examples

Specify Model for Metric Analysis

This example shows how to set the root model, create an `slmetric.Engine` object, and specify the model for metric analysis.

```
% Set root model to vdp model
RootModel='vdp';

% Create an slmetric.Engine object
metric_engine = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(metric_engine, 'Root', RootModel);
```

Specify Subsystem for Metric Analysis

This example shows how to set the root model, create an `slmetric.Engine` object, and specify a subsystem for metric analysis.

```
% Set subsystem to CounterA
Subsys = 'sf_car/Engine';

% Create an slmetric.Engine object
metric_engine = slmetric.Engine();

% Set a subsystem for metric analysis
```

```
setAnalysisRoot(metric_engine, 'Root', Subsys, 'RootType', 'Subsystem');
```

See Also

See Also

`slmetric.metric.ResultCollection` | `slmetric.metric.Metric` |
`slmetric.metric.getAvailableMetrics`

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2016a

setBold

Class: ModelAdvisor.Text

Package: ModelAdvisor

Specify bold text

Syntax

```
setBold(text, mode)
```

Description

`setBold(text, mode)` specifies whether `text` should be formatted in bold font.

Input Arguments

| | |
|-------------------|---|
| <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”

Topics

“Create Model Advisor Checks”

setCallbackFcn

Class: ModelAdvisor.Action

Package: ModelAdvisor

Specify action callback function

Syntax

```
setCallbackFcn(action_obj, @handle)
```

Description

`setCallbackFcn(action_obj, @handle)` specifies the handle to the callback function, `handle`, to use with the action object, `action_obj`.

Examples

Note: The following example is a fragment of code from the `sl_customization.m` file for the example model, `slvndemo_mdladv`. The example does not execute as shown without the additional content found in the `sl_customization.m` file.

```
rec = ModelAdvisor.Check('mathworks.example.optimizationSettings');  
% Define an automatic fix action for this check  
modifyAction = ModelAdvisor.Action;  
modifyAction.setCallbackFcn(@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”

Topics

“Define Check Actions”

“Create Model Advisor Checks”

“setActionEnable” (Simulink)

setCallbackFcn

Class: ModelAdvisor.Check

Package: ModelAdvisor

Specify callback function for check

Syntax

```
setCallbackFcn(check_obj, @handle, context, style)
```

Description

setCallbackFcn(check_obj, @handle, context, style) specifies the callback function to use with the check, check_obj.

Input Arguments

| | |
|-----------|--|
| check_obj | Instantiation of the ModelAdvisor.Check class |
| handle | Handle to a check callback function |
| context | Context for checking the model or subsystem: <ul style="list-style-type: none"> • 'None' — No special requirements. • 'PostCompile' — The model must be compiled. |
| style | 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”

Topics

“Create Callback Functions and Results”

“Create Model Advisor Checks”

setCheck

Class: ModelAdvisor.Task

Package: ModelAdvisor

Specify check used in task

Syntax

```
setCheck(task, check_ID)
```

Description

setCheck(task, check_ID) specifies the check to use in the task.

You can use one ModelAdvisor.Check object in multiple ModelAdvisor.Task objects, allowing you to place the same check in multiple locations in the Model Advisor tree. For example, **Check for implicit signal resolution** appears in the **By Product > Simulink folder** and in the **By Task > Model Referencing** folder in the Model Advisor tree.

When adding checks as tasks, the Model Advisor uses the task properties instead of the check properties, except for **Visible** and **LicenseName**.

Input Arguments

| | |
|----------|--|
| task | Instantiation of the ModelAdvisor.Task class |
| check_ID | A unique identifier for the check to use in the task |

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
setCheck(MAT1, 'com.mathworks.sample.Check1');
```

setCheckText

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add description of check to result

Syntax

```
setCheckText(ft_obj, text)
```

Description

`setCheckText(ft_obj, text)` is an optional method that adds text or a model advisor template object as the first item in the report. Use this method to add information describing the overall check.

Input Arguments

ft_obj

A handle to a template object.

text

A character vector or a handle to a formatting object.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

text appears as the first line in the analysis result.

Examples

Create a list object, `ft`, and add a line of text to the result:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
setCheckText(ft, ['Identify unconnected lines, input ports,...  
    'and output ports in the model']);
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setColHeading

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify table column title

Syntax

```
setColHeading(table, column, heading)
```

Description

`setColHeading(table, column, heading)` specifies that the column header of column is set to heading.

Input Arguments

| | |
|----------------------|---|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>column</code> | An integer specifying the column number |
| <code>heading</code> | A character vector, element object, or object array specifying the table column title |

Examples

```
table1 = ModelAdvisor.Table(2, 3);  
setColHeading(table1, 1, 'Header 1');  
setColHeading(table1, 2, 'Header 2');  
setColHeading(table1, 3, 'Header 3');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setColHeadingAlign

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify column title alignment

Syntax

```
setColHeadingAlign(table, column, alignment)
```

Description

`setColHeadingAlign(table, column, alignment)` specifies the alignment of the column heading.

Input Arguments

| | |
|-------------------------------|--|
| <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”

Topics

“Create Model Advisor Checks”

setColHeadingValign

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify column title vertical alignment

Syntax

```
setColHeadingValign(table, column, alignment)
```

Description

`setColHeadingValign(table, column, alignment)` specifies the vertical alignment of the column heading.

Input Arguments

| | |
|-------------------------------|--|
| <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”

Topics

“Create Model Advisor Checks”

setColor

Class: ModelAdvisor.Text

Package: ModelAdvisor

Specify text color

Syntax

```
setColor(text, color)
```

Description

`setColor(text, color)` sets the `text` color to `color`.

Input Arguments

| | |
|--------------------|--|
| <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class |
| <code>color</code> | Color of the text, specified as one of the following formatting options: <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 character vectors or handles to formatting objects, specifying the column titles.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

The order of the `col_title_N` inputs determines which column the title is in. If you do not add data to the table, the Model Advisor does not display the table in the result.

Examples

Create a table object, `ft`, and specify two column titles:

```
ft = ModelAdvisor.FormatTemplate('TableTemplate');  
setColTitles(ft, {'Index', 'Block Name'});
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setColWidth

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify column widths

Syntax

```
setColWidth(table, column, width)
```

Description

`setColWidth(table, column, width)` specifies the column.

The `setColWidth` method specifies the table column widths relative to the entire table width. If column widths are [1 2 3], the second column is twice the width of the first column, and the third column is three times the width of the first column. Unspecified columns have a default width of 1. For example:

```
setColWidth(1, 1);  
setColWidth(3, 2);  
specifies [1 1 2] column widths.
```

Input Arguments

| | |
|---------------------|--|
| <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”

Topics

“Create Model Advisor Checks”

setEntries

Class: ModelAdvisor.Table

Package: ModelAdvisor

Set contents of table

Syntax

```
setEntries(content)
```

Description

setEntries(content) sets content of the table.

Input Arguments

| | |
|---------|---|
| content | A 2-D cell array containing the contents of the table. Each item of the cell array must be either a character vector or an instance of ModelAdvisor.Element. The size of the cell array must be equal to the size of the table specified in the ModelAdvisor.Table constructor. |
|---------|---|

Examples

```
table = ModelAdvisor.Table(4,3);
contents = cell(4,3); % 4 by 3 table
for k=1:4
    for m=1:3
        contents{k,m} = ['Contents for row-' num2str(k) ' column-' num2str(m)];
    end
end
table.setEntries(contents);
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setEntry

Class: ModelAdvisor.Table

Package: ModelAdvisor

Add cell to table

Syntax

```
setEntry(table, row, column, string)
setEntry(table, row, column, content)
```

Description

`setEntry(table, row, column, string)` adds a character vector to a cell in a table.

`setEntry(table, row, column, content)` adds an object specified by `content` to a cell in a table.

Input Arguments

| | |
|----------------------|---|
| <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 character vector 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”

Topics

“Create Model Advisor Checks”

setEntryAlign

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify table cell alignment

Syntax

```
setEntryAlign(table, row, column, alignment)
```

Description

`setEntryAlign(table, row, column, alignment)` specifies the cell alignment of the designated cell.

Input Arguments

| | |
|-------------------------------|--|
| <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> | Cell alignment, specified as one of the following: <ul style="list-style-type: none">• 'left' (default)• 'right'• 'center' |

Examples

```
table1 = ModelAdvisor.Table(2,3);  
setHeading(table1, 'New Table');  
:  
:
```

```
.  
setEntry(table1, 1, 1, 'First Entry');  
setEntryAlign(table1, 1, 1, 'center');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setEntryValign

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify table cell vertical alignment

Syntax

```
setEntryValign(table, row, column, alignment)
```

Description

`setEntryValign(table, row, column, alignment)` specifies the cell alignment of the designated cell.

Input Arguments

| | |
|-------------------------------|---|
| <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> | Cell vertical alignment, specified as one of the following: <ul style="list-style-type: none">• 'top' (default)• 'middle'• 'bottom' |

Examples

```
table1 = ModelAdvisor.Table(2,3);  
setHeading(table1, 'New Table');  
:  
:
```

```
.  
setEntry(table1, 1, 1, 'First Entry');  
setEntryValign(table1, 1, 1, 'middle');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setHeading

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify table title

Syntax

```
setHeading(table, title)
```

Description

`setHeading(table, title)` specifies the table title.

Input Arguments

| | |
|--------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>title</code> | A character vector, element object, or object array that specifies the table title |

Examples

```
table1 = ModelAdvisor.Table(2, 3);  
setHeading(table1, 'New Table');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setHeadingAlign

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify table title alignment

Syntax

```
setHeadingAlign(table, alignment)
```

Description

`setHeadingAlign(table, alignment)` specifies the alignment for the table title.

Input Arguments

| | |
|-------------------------------|---|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code><i>alignment</i></code> | Table title alignment, specified as one of the following: <ul style="list-style-type: none">• 'left' (default)• 'right'• 'center' |

Examples

```
table1 = ModelAdvisor.Table(2, 3);  
setHeading(table1, 'New Table');  
setHeadingAlign(table1, 'center');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setHyperlink

Class: ModelAdvisor.Image

Package: ModelAdvisor

Specify hyperlink location

Syntax

```
setHyperlink(image, url)
```

Description

`setHyperlink(image, url)` specifies the target location of the hyperlink associated with `image`.

Input Arguments

| | |
|--------------------|--|
| <code>image</code> | Instantiation of the <code>ModelAdvisor.Image</code> class |
| <code>url</code> | The target URL |

Examples

```
matlab_logo=ModelAdvisor.Image;  
setHyperlink(matlab_logo, 'http://www.mathworks.com');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setHyperlink

Class: ModelAdvisor.Text

Package: ModelAdvisor

Specify hyperlinked text

Syntax

```
setHyperlink(text, url)
```

Description

`setHyperlink(text, url)` creates a hyperlink from the text to the specified URL.

Input Arguments

| | |
|-------------------|---|
| <code>text</code> | Instantiation of the <code>ModelAdvisor.Text</code> class |
| <code>url</code> | The target location of the URL |

Examples

```
t1 = ModelAdvisor.Text('MathWorks home page');  
setHyperlink(t1, 'http://www.mathworks.com');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setImageSource

Class: ModelAdvisor.Image

Package: ModelAdvisor

Specify image location

Syntax

```
setImageSource(image_obj, source)
```

Description

`setImageSource(image_obj, source)` specifies the location of the image.

Input Arguments

| | |
|------------------------|--|
| <code>image_obj</code> | Instantiation of the <code>ModelAdvisor.Image</code> class |
| <code>source</code> | The location of the image file |

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setInformation

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add description of subcheck to result

Syntax

```
setInformation(ft_obj, text)
```

Description

`setInformation(ft_obj, text)` is an optional method that adds *text* as the first item after the subcheck title. Use this method to add information describing the subcheck.

Input Arguments

ft_obj

A handle to a template object.

text

A character vector or a handle to a formatting object, that describes the subcheck.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

The Model Advisor displays *text* after the title of the subcheck.

Examples

Create a list object, `ft`, and specify a subcheck title and description:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
setSubTitle(ft, ['Check for constructs in the model '...
    'that are not supported when generating code']);
setInformation(ft, ['Identify blocks that should not '...
    'be used for code generation.']);
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setInputParameters

Class: ModelAdvisor.Check

Package: ModelAdvisor

Specify input parameters for check

Syntax

```
setInputParameters(check_obj, params)
```

Description

`setInputParameters(check_obj, params)` specifies `ModelAdvisor.InputParameter` objects (`params`) to be used as input parameters to a check (`check_obj`).

Input Arguments

| | |
|------------------------|---|
| <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`

Topics

“Create Model Advisor Checks”

setInputParametersLayoutGrid

Class: ModelAdvisor.Check

Package: ModelAdvisor

Specify layout grid for input parameters

Syntax

```
setInputParametersLayoutGrid(check_obj, [row col])
```

Description

`setInputParametersLayoutGrid(check_obj, [row col])` specifies the layout grid for input parameters in the Model Advisor. Use the `setInputParametersLayoutGrid` method when there are multiple input parameters.

Input Arguments

| | |
|------------------------|--|
| <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`

Topics

“Create Model Advisor Checks”

setItalic

Class: ModelAdvisor.Text

Package: ModelAdvisor

Italicize text

Syntax

```
setItalic(text, mode)
```

Description

`setItalic(text, mode)` specifies whether `text` should be italicized.

Input Arguments

| | |
|-------------------|---|
| <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”

Topics

“Create Model Advisor Checks”

setListObj

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add list of hyperlinks to model objects

Syntax

```
setListObj(ft_obj, {model_obj})
```

Description

`setListObj(ft_obj, {model_obj})` is an optional method that generates a bulleted list of hyperlinks to model objects. *ft_obj* is a handle to a list template object. *model_obj* is a cell array of handles or full paths to blocks, or model objects that the Model Advisor displays as a bulleted list of hyperlinks in the report.

Examples

Create a list object, `ft`, and add a list of the blocks found in the model:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
  
% Find all the blocks in the system  
allBlocks = find_system(system);  
  
% Add the blocks to a list  
setListObj(ft, allBlocks);
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setRecAction

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add Recommended Action section and text

Syntax

```
setRecAction(ft_obj, {text})
```

Description

`setRecAction(ft_obj, {text})` is an optional method that adds a Recommended Action section to the report. Use this method to describe how to fix the check.

Input Arguments

ft_obj

A handle to a template object.

text

A cell array of character vectors or handles to formatting objects, that describes the recommended action to fix the issues reported by the check.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

The Model Advisor displays the recommended action as a separate section below the list or table in the report.

Examples

Create a list object, `ft`, find Gain blocks in the model, and recommend changing them:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
% Find all Gain blocks
gainBlocks = find_system(gcs, 'BlockType','Gain');

% Find Gain blocks
for idx = 1:length(gainBlocks)
    gainObj = get_param(gainBlocks(idx), 'Object');

    setRecAction(ft, {'If you are using these blocks '...
        'as buffers, you should replace them with '...
        'Signal Conversion blocks'});
end
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setRefLink

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add See Also section and links

Syntax

```
setRefLink(ft_obj, {'standard'})
setRefLink(ft_obj, {'url', 'standard'})
```

Description

`setRefLink(ft_obj, {'standard'})` is an optional method that adds a See Also section above the table or list in the result. Use this method to add references to standards. `ft_obj` is a handle to a template object. `standard` is a cell array of character vectors that you want to display in the result. If you include more than one cell, the Model Advisor displays the character vectors in a bulleted list.

`setRefLink(ft_obj, {'url', 'standard'})` generates a list of links in the See Also section. `url` indicates the location to link to. You must provide the full link including the protocol. For example, `http:\www.mathworks.com` is a valid link, while `www.mathworks.com` is not a valid link. You can create a link to a protocol that is valid URL, such as a web site address, a full path to a file, or a relative path to a file.

Note: `setRefLink` expects a cell array of cell arrays for the second input.

Examples

Create a list object, `ft`, and add a related standard:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
setRefLink(ft, {'IEC 61508-3, Table A.3 (3) 'Language subset'});
```

Create a list object, `ft`, and add a list of related standards:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
setRefLink(ft, {
    {'IEC 61508-3, Table A.3 (2) ''Strongly typed programming language''},...
    {'IEC 61508-3, Table A.3 (3) ''Language subset''}});
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setRetainSpaceReturn

Class: ModelAdvisor.Text

Package: ModelAdvisor

Retain spacing and returns in text

Syntax

```
setRetainSpaceReturn(text, mode)
```

Description

`setRetainSpaceReturn(text, mode)` specifies whether the text must retain the spaces and carriage returns.

Input Arguments

| | |
|-------------------|---|
| <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”

Topics

“Create Model Advisor Checks”

setRowHeading

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify table row title

Syntax

```
setRowHeading(table, row, heading)
```

Description

setRowHeading(table, row, heading) specifies a title for the designated table row.

Input Arguments

| | |
|---------|--|
| table | Instantiation of the ModelAdvisor.Table class |
| row | An integer specifying row number |
| heading | A character vector, element object, or object array specifying the table row title |

Examples

```
table1 = ModelAdvisor.Table(2,3);  
setRowHeading(table1, 1, 'Row 1 Title');  
setRowHeading(table1, 2, 'Row 2 Title');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setRowHeadingAlign

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify table row title alignment

Syntax

```
setRowHeadingAlign(table, row, alignment)
```

Description

`setRowHeadingAlign(table, row, alignment)` specifies the alignment for the designated table row.

Input Arguments

| | |
|-------------------------------|--|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>row</code> | An integer specifying row number. |
| <code><i>alignment</i></code> | Cell alignment, specified as one of the following: <ul style="list-style-type: none">• 'left' (default)• 'right'• 'center' |

Examples

```
table1 = ModelAdvisor.Table(2, 3);  
setRowHeading(table1, 1, 'Row 1 Title');  
setRowHeadingAlign(table1, 1, 'center');  
setRowHeading(table1, 2, 'Row 2 Title');  
setRowHeadingAlign(table1, 2, 'center');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

setRowHeadingValign

Class: ModelAdvisor.Table

Package: ModelAdvisor

Specify table row title vertical alignment

Syntax

```
setRowHeadingValign(table, row, alignment)
```

Description

`setRowHeadingValign(table, row, alignment)` specifies the vertical alignment for the designated table row.

Input Arguments

| | |
|-------------------------------|---|
| <code>table</code> | Instantiation of the <code>ModelAdvisor.Table</code> class |
| <code>row</code> | An integer specifying row number. |
| <code><i>alignment</i></code> | Cell vertical alignment, specified as one of the following: <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”

Topics

“Create Model Advisor Checks”

setRowSpan

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Specify rows for input parameter

Syntax

```
setRowSpan(input_param, [start_row end_row])
```

Description

`setRowSpan(input_param, [start_row end_row])` specifies the number of rows that the parameter occupies. Specify where you want an input parameter located in the layout grid when there are multiple input parameters.

Input Arguments

| | |
|--------------------------|--|
| <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”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setSubResultStatus

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add status to check or subcheck result

Syntax

```
setSubResultStatus(ft_obj, 'status')
```

Description

`setSubResultStatus(ft_obj, 'status')` is an optional method that displays the status in the result. Use this method to display the status of the check or subcheck in the result. *ft_obj* is a handle to a template object. *status* is a character vector identifying the status of the check:

Pass

Warn

Fail

Examples

Create a list object, `ft`, and add a passing status:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
setSubResultStatus(ft, 'Pass');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setSubResultStatusText

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add text below status in result

Syntax

```
setSubResultStatusText(ft_obj, message)
```

Description

`setSubResultStatusText(ft_obj, message)` is an optional method that displays text below the status in the result. Use this method to describe the status.

Input Arguments

ft_obj

A handle to a template object.

message

A character vector or a handle to a formatting object that the Model Advisor displays below the status in the report.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

Examples

Create a list object, `ft`, add a passing status and a description of why the check passed:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');
```

```
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”

Topics

“Model Advisor Customization”

“Format Check Results”

setSubscript

Class: ModelAdvisor.Text

Package: ModelAdvisor

Specify subscripted text

Syntax

```
setSubscript(text, mode)
```

Description

setSubscript(text, mode) indicates whether to make text subscript.

Input Arguments

| | |
|------|--|
| text | Instantiation of the ModelAdvisor.Text class |
| mode | A Boolean value indicating subscripted formatting of text: <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”

Topics

“Create Model Advisor Checks”

setSuperscript

Class: ModelAdvisor.Text

Package: ModelAdvisor

Specify superscripted text

Syntax

```
setSuperscript(text, mode)
```

Description

`setSuperscript(text, mode)` indicates whether to make text superscript.

Input Arguments

| | |
|-------------------|--|
| <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”

Topics

“Create Model Advisor Checks”

setSubTitle

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add title for subcheck in result

Syntax

```
setSubTitle(ft_obj, title)
```

Description

`setSubTitle(ft_obj, title)` is an optional method that adds a subcheck result title. Use this method when you create subchecks to distinguish between them in the result.

Input Arguments

ft_obj

A handle to a template object.

title

A character vector or a handle to a formatting object specifying the title of the subcheck.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

Examples

Create a list object, `ft`, and add a subcheck title:

```
ft = ModelAdvisor.FormatTemplate('ListTemplate');  
setSubTitle(ft, ['Check for constructs in the model '...]
```

```
'that are not supported when generating code']);
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setTableInfo

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add data to table

Syntax

```
setTableInfo(ft_obj, {data})
```

Description

`setTableInfo(ft_obj, {data})` is an optional method that creates a table. *ft_obj* is a handle to a table template object. *data* is a cell array of character vectors or objects specifying the information in the body of the table. The Model Advisor creates hyperlinks to objects. If you do not add data to the table, the Model Advisor does not display the table in the result.

Note: Before creating a table, you must specify column titles using the `setColTitle` method.

Examples

Create a table object, `ft`, add column titles, and add data to the table:

```
ft = ModelAdvisor.FormatTemplate('TableTemplate');  
setColTitle(ft, {'Index', 'Block Name'});  
setTableInfo(ft, {'1', 'Gain'});
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setTableTitle

Class: ModelAdvisor.FormatTemplate

Package: ModelAdvisor

Add title to table

Syntax

```
setTableTitle(ft_obj, title)
```

Description

`setTableTitle(ft_obj, title)` is an optional method that adds a title to a table.

Input Arguments

ft_obj

A handle to a template object.

title

A character vector or a handle to a formatting object specifying the title of the table.

Valid formatting objects are: `ModelAdvisor.Image`, `ModelAdvisor.LineBreak`, `ModelAdvisor.List`, `ModelAdvisor.Paragraph`, `ModelAdvisor.Table`, and `ModelAdvisor.Text`.

The title appears above the table. If you do not add data to the table, the Model Advisor does not display the table and title in the result.

Examples

Create a table object, `ft`, and add a table title:

```
ft = ModelAdvisor.FormatTemplate('TableTemplate');  
setTableTitle(ft, 'Table of fonts and styles used in model');
```

See Also

“Model Advisor Customization”

Topics

“Create Model Advisor Checks”

“Format Check Results”

setType

Class: ModelAdvisor.List

Package: ModelAdvisor

Specify list type

Syntax

```
setType(list_obj, listType)
```

Description

`setType(list_obj, listType)` specifies the type of list the `ModelAdvisor.List` constructor creates.

Input Arguments

| | |
|-----------------------|--|
| <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”

Topics

“Create Model Advisor Checks”

setUnderlined

Class: ModelAdvisor.Text

Package: ModelAdvisor

Underline text

Syntax

```
setUnderlined(text, mode)
```

Description

`setUnderlined(text, mode)` indicates whether to underline `text`.

Input Arguments

| | |
|-------------------|---|
| <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”

Topics

“Create Model Advisor Checks”

sigrangeinfo

Retrieve signal range coverage information from `cvdata` object

Syntax

```
[min, max] = sigrangeinfo(cvdo, object)
[min, max] = sigrangeinfo(cvdo, object, portID)
```

Description

`[min, max] = sigrangeinfo(cvdo, object)` returns the minimum and maximum signal values output by the model component `object` within the `cvdata` object `cvdo`.

`[min, max] = sigrangeinfo(cvdo, object, portID)` returns the minimum and maximum signal values associated with the output port `portID` of the Simulink block `object`.

Input Arguments

cvdo

`cvdata` object

object

An object in the model or Stateflow chart that receives signal range coverage. Valid values for `object` include the following:

| Object Specification | Description |
|--------------------------|---------------------------------|
| <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} | Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |

portID

Output port of the block object

Output Arguments

max

Maximum signal value output by the model component `object` within the `cvdata` object, `cvdo`. If `object` outputs a vector, `min` and `max` are also vectors.

min

Minimum signal value output by the model component `object` within the `cvdata` object, `cvdo`. If `object` outputs a vector, `min` and `max` are also vectors.

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)
```

Alternatives

Use the coverage settings to collect signal range coverage for a model:

- 1 Open the model for which you want to collect signal range coverage.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Under **Coverage metrics**, select **Signal Range**.
- 5 On the **Coverage > Results** pane, specify the output you need.
- 6 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 7 Simulate the model and review the results.

See Also

complexityinfo | cvsim | conditioninfo | decisioninfo | getCoverageInfo | mcdinfo | overflowsaturationinfo | sigsizeinfo | tableinfo

Introduced in R2006b

sigsizeinfo

Retrieve signal size coverage information from `cvdata` object

Syntax

```
[min, max, allocated] = sigsizeinfo(data, object)
[min, max, allocated] = sigsizeinfo(data, object, portID)
```

Description

`[min, max, allocated] = sigsizeinfo(data, object)` returns the minimum, maximum, and allocated signal sizes for the outputs of model component `object` within the coverage data object `data`, if `object` supports variable size signals.

`[min, max, allocated] = sigsizeinfo(data, object, portID)` returns the minimum and maximum signal sizes associated with the output port `portID` of the model component `object`.

Input Arguments

data

`cvdata` object

object

An object in the model or Stateflow chart that receives signal size coverage. Valid values for `object` include the following:

| Object Specification | Description |
|--------------------------|--|
| <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 |

| 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> | Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart |

portID

Output port number of the model component `object`

Output Arguments

max

Maximum signal size output by the model component `object` within the `cvdata` object data. If `object` has multiple outputs, `max` is a vector.

min

Minimum signal size output by the model component `object` within the `cvdata` object data. If `object` has multiple outputs, `min` is a vector.

allocated

Allocated signal size output by the model component `object` within the `cvdata` object data. If `object` has multiple outputs, `allocated` is a vector.

Examples

Collect signal size coverage data for the Switch block in the `sldemo_varsize_basic` model:

```
mdl = 'sldemo_varsize_basic';
open_system(mdl);
%Create test spec object
testObj = cvtest(mdl);
%Enable signal size coverage
testObj.settings.sigsize=1;
%Simulate the model
data = cvsim(testObj);
%Set the block handle
blk_handle = get_param([mdl, '/Switch'], 'Handle');
%Get signal size data
[minVal, maxVal, allocVal] = sigsizeinfo(data, blk_handle);
```

Alternatives

Use the coverage settings to collect signal size coverage for a model:

- 1 Open the model for which you want to collect signal size coverage.
- 2 In the Simulink Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Under **Coverage metrics**, select **Signal Size**.
- 5 On the **Coverage > Results** pane, specify the output you need.
- 6 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 7 Simulate the model and review the results.

See Also

[complexityinfo](#) | [cvsim](#) | [conditioninfo](#) | [decisioninfo](#) | [mcdcinfo](#) | [sigrangeinfo](#) | [tableinfo](#)

Topics

Introduced in R2010b

slmetric.Engine class

Package: slmetric

Collect metric data on models or model components

Description

Use a `slmetric.Engine` object to collect metric data on models by calling `slmetric.Engine.execute`. Use `slmetric.Engine.getMetrics` to access the metric data and return an array of `slmetric.metric.ResultCollection` objects. This metric data is persistent in the simulation cache folder. Future instantiations of the `slmetric.Engine` object for the same model can access the cached metric data without regenerating the metric data.

Construction

`metric_engine = slmetric.Engine()` creates a metric engine object.

Properties

AnalysisRoot — Name of root model or subsystem on which to collect metric data

character vector

Name of root model or subsystem on which to collect metric data, as specified by the `slmetric.Engine.setAnalysisRoot` method. This property is read-only.

AnalyzeLibraries — Collect metric data on library linked subsystems in the model

1 (default)

Specify if the metric engine analyzes any library-linked subsystems in the root model, including libraries inside referenced models under the root. Metric analysis does not include linked blocks to Simulink built-in libraries. Set this parameter to `false` or `0` to not include libraries in the metric analysis.

Data Types: logical

AnalyzeModelReferences — Collect metric data on all referenced models under the root model

1 (default)

Specify if the metric engine analyzes referenced models in your root model. Set this parameter to `false` or `0` to not include referenced models in the metric analysis.

Data Types: `logical`

Methods

| | |
|------------------------------------|---|
| <code>execute</code> | Collect metric data |
| <code>getAnalysisRootMetric</code> | Get metric data for one metric for analysis root only |
| <code>getErrorLog</code> | Get error log |
| <code>getMetricDistribution</code> | Get metric distribution |
| <code>getMetrics</code> | Access model metric data |
| <code>getStatistics</code> | Get statistics on metric data |
| <code>setAnalysisRoot</code> | Specify model or subsystem for metric analysis |
| <code>exportMetrics</code> | Export model metrics |

Examples

Collect and Access Metric Data for a Model

Collect and access model metric data for the model `sldemo_md1ref_basic`.

Create an `slmetric.Engine` object and set the root in the model for analysis.

```
metric_engine = slmetric.Engine();

% Include referenced models and libraries in the analysis, these properties are on by default
metric_engine.AnalyzeModelReferences = 1;
metric_engine.AnalyzeLibraries = 1;

setAnalysisRoot(metric_engine, 'Root', 'sldemo_md1ref_basic');
```

Collect model metric data

```
execute(metric_engine, 'mathworks.metric.SimulinkBlockCount');
```

Get the model metric data that returns an array of `slmetric.metric.ResultCollection` objects, `res_col`.

```
res_col = getMetrics(metric_engine, 'mathworks.metrics.SimulinkBlockCount');
```

Display the results for the `mathworks.metrics.SimulinkBlockCount` metric.

```
for n=1:length(res_col)
    if res_col(n).Status == 0
        result = res_col(n).Results;

        for m=1:length(result)
            disp(['MetricID: ', result(m).MetricID]);
            disp([' ComponentPath: ', result(m).ComponentPath]);
            disp([' Value: ', num2str(result(m).Value)]);
            disp([' AggregatedValue: ', num2str(result(m).AggregatedValue)]);
        end
    else
        disp(['No results for:', result(n).MetricID]);
    end
    disp(' ');
end
```

See Also

See Also

`slmetric.metric.Result` | `slmetric.metric.ResultCollection` |
`slmetric.metric.getAvailableMetrics`

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2016a

slmetric.metric.getAvailableMetrics

Package: slmetric.metric

Obtain available metrics

Syntax

```
IDs = slmetric.metric.getAvailableMetrics()  
[IDs,props] = slmetric.metric.getAvailableMetrics()
```

Description

`IDs = slmetric.metric.getAvailableMetrics()` get metric identifiers for available metrics in the metric engine.

`[IDs,props] = slmetric.metric.getAvailableMetrics()` get metric identifiers and properties.

Examples

Obtain Available Metric IDs for Model

This example shows how to obtain the available model metric IDs.

```
ID = slmetric.metric.getAvailableMetrics()  
ID =  
  
    'mathworks.metrics.CyclomaticComplexity'  
    'mathworks.metrics.DescriptiveBlockNames'  
    'mathworks.metrics.IOCount'  
    'mathworks.metrics.LayerSeparation'  
    'mathworks.metrics.LibraryLinkCount'  
    'mathworks.metrics.MatlabCodeAnalyzerWarnings'  
    'mathworks.metrics.MatlabLOCCount'  
    'mathworks.metrics.ModelAdvisorCheckCompliance.misra_c'  
    'mathworks.metrics.ModelAdvisorCheckCompliance.do178'
```

```
'mathworks.metrics.ModelAdvisorCheckCompliance.ISO26262'  
'mathworks.metrics.ModelAdvisorCheckCompliance.maab'  
'mathworks.metrics.ModelAdvisorCheckIssues.misra_c'  
'mathworks.metrics.ModelAdvisorCheckIssues.do178'  
'mathworks.metrics.ModelAdvisorCheckIssues.ISO26262'  
'mathworks.metrics.ModelAdvisorCheckIssues.maab'  
'mathworks.metrics.SimulinkBlockCount'  
'mathworks.metrics.StateflowChartObjectCount'  
'mathworks.metrics.StateflowLOCCount'  
'mathworks.metrics.SubSystemCount'  
'mathworks.metrics.SubSystemDepth'
```

Obtain Available Metric IDs and Metric Properties

This example shows how to obtain the available model metric properties.

```
[ID,PROPS]=slmetric.metric.getAvailableMetrics()
```

ID =

```
'mathworks.metrics.CyclomaticComplexity'  
'mathworks.metrics.DescriptiveBlockNames'  
'mathworks.metrics.IOCount'  
'mathworks.metrics.LayerSeparation'  
'mathworks.metrics.LibraryLinkCount'  
'mathworks.metrics.MatlabCodeAnalyzerWarnings'  
'mathworks.metrics.MatlabLOCCount'  
'mathworks.metrics.ModelAdvisorCheckCompliance.misra_c'  
'mathworks.metrics.ModelAdvisorCheckCompliance.do178'  
'mathworks.metrics.ModelAdvisorCheckCompliance.ISO26262'  
'mathworks.metrics.ModelAdvisorCheckCompliance.maab'  
'mathworks.metrics.ModelAdvisorCheckIssues.misra_c'  
'mathworks.metrics.ModelAdvisorCheckIssues.do178'  
'mathworks.metrics.ModelAdvisorCheckIssues.ISO26262'  
'mathworks.metrics.ModelAdvisorCheckIssues.maab'  
'mathworks.metrics.SimulinkBlockCount'  
'mathworks.metrics.StateflowChartObjectCount'  
'mathworks.metrics.StateflowLOCCount'  
'mathworks.metrics.SubSystemCount'  
'mathworks.metrics.SubSystemDepth'
```

PROPS =

1x20 struct array with fields:

Name
Description
IsBuiltIn
Version

Output Arguments

IDs — Metric identifiers

cell array of character vectors

Metric identifiers in the metric engine.

props — Metric properties

structure array

Metric properties, returned as a structure array with the following fields:

| | |
|-------------|--|
| Name | Name of the metric algorithm. |
| Description | Description of the metric algorithm. |
| IsBuiltIn | Boolean indicating if the metric is included with Simulink Verification and Validation™. |
| Version | Metric algorithm version. |

Data Types: struct

See Also

See Also

slmetric.Engine | slmetric.metric.Result | slmetric.metric.ResultCollection

Introduced in R2016a

slmetric.metric.Result class

Package: slmetric.metric

Metric data for specified model component and metric algorithm

Description

Instances of `slmetric.metric.Result` contain the metric data for a specified model component and metric algorithm.

Construction

`metric_result = slmetric.metric.Result` creates a handle to a metric results object.

Properties

ComponentID — Component ID

character vector

Unique identifier of the component object for which the metric is calculated. Use `ComponentID` to trace the generated result object to the analyzed component. Set the `ComponentID` or `ComponentPath` properties by using the `slmetric.metric.Metric.algorithm` method.

This property is read/write.

Data Types: char

ComponentPath — Component path

character vector

Component path for which metric is calculated. Use `ComponentPath` as an alternative to setting the `ComponentID` property. The metric engine converts the `ComponentPath` to a `ComponentID`. Set the `ComponentID` or `ComponentPath` properties by using the `slmetric.metric.Metric.algorithm` method.

This property is read/write.

Data Types: char

MetricID — Metric identifier

character vector

Metric identifier for “Model Metrics” on page 3-236 or custom model metrics that you create. You can get metric identifiers by calling `slmetric.metric.getAvailableMetrics`.

This property is read/write.

Data Types: char

Value — Metric value

double (default)

Metric scalar value, generated by the algorithm for the metric specified by `MetricID` and the component specified by `ComponentID`.

This property is read/write.

Data Types: double

AggregatedValue — Aggregated metric value

double (default)

Metric value aggregated across the model hierarchy. The metric engine implicitly aggregates the metric values. Do not set this property.

This property is read-only.

Data Types: double

Measures — Metric measures

double array

Metric measures, optionally specified by the metric algorithm. Metric measures contain detailed information about the metric value. For example, for a metric that counts the number of blocks per subsystem, you can specify measures that contain the number of virtual and nonvirtual blocks. The metric value is the sum of the virtual and nonvirtual block count.

Set the property by using the `slmetric.metric.Metric.algorithm` method. This property is read/write.

Data Types: `double`

AggregatedMeasures — Aggregated metric measures

`double array`

Metric measures value aggregated across the model hierarchy. The metric engine implicitly aggregates the metric measure values. Do not set this property.

This property is read-only.

Data Types: `double`

UserData — User data

`character vector`

User data optionally provided by the metric algorithm.

This property is read/write.

Data Types: `char`

Examples

Collect and Access Metric Data for One Metric

Collect and access model metric data for the model `sldemo_mdref_basic`.

Create an `slmetric.Engine` object and set the root in the model for analysis.

```
metric_engine = slmetric.Engine();

% Include referenced models and libraries in the analysis,
%   these properties are on by default
metric_engine.AnalyzeModelReferences = 1;
metric_engine.AnalyzeLibraries = 1;

setAnalysisRoot(metric_engine, 'Root', 'sldemo_mdref_basic');

Collect model metric data
execute(metric_engine, 'mathworks.metric.SimulinkBlockCount');
```

Get the model metric data that returns an array of `slmetric.metric.ResultCollection` objects, `res_col`.

```
res_col = getMetrics(metric_engine, 'mathworks.metrics.SimulinkBlockCount');
```

Display the results for the `mathworks.metrics.SimulinkBlockCount` metric.

```
for n=1:length(res_col)
    if res_col(n).Status == 0
        result = res_col(n).Results;

        for m=1:length(result)
            disp(['MetricID: ', result(m).MetricID]);
            disp([' ComponentPath: ', result(m).ComponentPath]);
            disp([' Value: ', num2str(result(m).Value)]);
            disp([' AggregatedValue: ', num2str(result(m).AggregatedValue)]);
        end
    else
        disp(['No results for:', result(n).MetricID]);
    end
    disp(' ');
end
```

See Also

See Also

`slmetric.Engine` | `slmetric.metric.Metric` | `slmetric.metric.ResultCollection`

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2016a

slmetric.metric.ResultCollection class

Package: slmetric.metric

Metric data for specified model metric

Description

Instances of `slmetric.metric.ResultCollection` contain the metric data for a specific model metric.

Construction

`metricRC = slmetric.metric.ResultCollection` creates a handle to a metric result collection object.

Properties

MetricID — Metric identifier

character vector

Metric identifier for a MathWorks metric or a custom metric. You can get metric identifiers by calling `slmetric.metric.getAvailableMetrics`.

Status — Unique identifier

integer

Status code of metric execution. This property is read-only.

| Integer | Status |
|---------|--|
| 1 | No result. Metric algorithm is not applicable to the analyzed system. Components analyzed by the metric not found, or metric with compile requirement cannot be executed on library model. |
| 0 | Result collected. |
| -1 | No result. Error executing metric. |

| Integer | Status |
|---------|--|
| -2 | No result available from previous run. |
| -3 | No result. Compilation error. |
| -4 | Empty result. Missing prerequisite. |

Results — Metric data collected for executing one or more metrics

Array of `slmetric.metric.Result` objects

Metric data collected when you call the `slmetric.Engine.execute` method for one or more metrics. This property is read-only.

Examples

Collect and Access Metric Data for One Metric

Collect and access model metric data for the model `sldemo_mdhref_basic`.

Create an `slmetric.Engine` object and set the root in the model for analysis.

```
metric_engine = slmetric.Engine();
```

```
% Include referenced models and libraries in the analysis, these properties are on by default
metric_engine.AnalyzeModelReferences = 1;
metric_engine.AnalyzeLibraries = 1;
```

```
setAnalysisRoot(metric_engine, 'Root', 'sldemo_mdhref_basic');
```

Collect model metric data.

```
execute(metric_engine, 'mathworks.metric.SimulinkBlockCount');
```

Get the model metric data that returns an array of `slmetric.metric.ResultCollection` objects, `res_col`.

```
res_col = getMetrics(metric_engine, 'mathworks.metrics.SimulinkBlockCount');
```

Display the results for the `mathworks.metrics.SimulinkBlockCount` metric.

```
for n=1:length(res_col)
    if res_col(n).Status == 0
        result = res_col(n).Results;
```

```
        for m=1:length(result)
            disp(['MetricID: ',result(m).MetricID]);
            disp([' ComponentPath: ', result(m).ComponentPath]);
            disp([' Value: ', num2str(result(m).Value)]);
            disp([' AggregatedValue: ', num2str(result(m).AggregatedValue)]);
        end
    else
        disp(['No results for:', result(n).MetricID]);
    end
    disp(' ');
end
```

See Also

See Also

`slmetric.Engine` | `slmetric.metric.Result` | `slmetric.metric.getAvailableMetrics`

Introduced in R2016a

slvnvextract

Extract subsystem or subchart contents into new model

Syntax

```
newModel = slvnvextract(subcomponent)  
newModel = slvnvextract(subcomponent, showModel)
```

Description

`newModel = slvnvextract(subcomponent)` extracts the contents of the Atomic Subsystem block or atomic subchart `subcomponent` and creates a model. `slvnvextract` returns the name of the new model in `newModel`. If the model name already exists, `slvnvextract` uses the subsystem or subchart name for the model name, appending a numeral to the model name.

Note: If an atomic subchart calls an exported graphical function that is outside the subchart, `slvnvextract` creates the model, but the new model does not compile.

`newModel = slvnvextract(subcomponent, showModel)` opens the extracted model if you set `showModel` to `true`. The extracted model is loaded only if you set `showModel` to `false`.

Input Arguments

subcomponent — Subsystem or subchart whose contents are extracted

character vector

The full path to the atomic subsystem or atomic subchart whose contents are extracted.

showModel — Display extracted model

true (default) | false

Specify if you want the extracted model to be displayed.

Output Arguments

newModel — The name of the new extracted model

character vector

Reports the name of the new extracted model created by `slvnvextract`.

Examples

Extract Subsystem and Copy to a New Model

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 Subchart and Copy to a New Model

Extract the Atomic Subchart block, Sensor1, from the `sf_atomic_sensor_pair` model and copy it into a new model:

```
open_system('sf_atomic_sensor_pair');  
newmodel = slvnvextract('sf_atomic_sensor_pair/RedundantSensors/Sensor1', true);
```

Introduced in R2010b

slvnharnessopts

Generate default options for slvnvmakeharness

Syntax

```
harnessopts = slvnharnessopts
```

Description

`harnessopts = slvnharnessopts` generates the default configuration for running `slvnvmakeharness`.

Output Arguments

harnessopts — Default configuration for slvnvmakeharness

structure

The `harnessopts` structure can have the following fields. If you do not specify any values, default values are used.

| 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 you do not specify this option, <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 <code>model</code> in a Model block. When <code>false</code> , the test harness model includes a copy of <code>model</code> . Default: true |

| Field | Description |
|-----------------|--|
| usedSignalsOnly | When <code>true</code> , the Signal Builder block in the harness model has signals only for input signals in the model. You must have the Simulink Design Verifier software and <code>model</code> must be compatible with that software to detect the input signals. Default: <code>false</code> |

Examples

Create a Test Harness with Default Options

```
% 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

Introduced in R2010b

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.

`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. Generate `harness_model` by 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 — Component or model

character vector | handle

The full block path name or handle to a Simulink Model block, specified as a character vector.

harness_model — Harness name

character vector | handle

Name or handle to a harness model that the Simulink Design Verifier software, `sldvmakeharness`, or `slvnvmakeharness` creates, specified as a character vector.

test_case_index — Indices of test cases to be simulated

Integer array

Array of integers that specifies which test cases in the Signal Builder block of the harness model to simulate.

Output Arguments

data — Output data

structure

Structure that contains the logged data.

Examples

Log and Visualize Simulation Data

Log simulation data for a Model block. Use the logged data to create a harness model and visualize the data in the referenced model.

```
% 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 = slvnvlogsignals('sldemo_mdhref_basic/CounterB');

% Create a harness model for sldemo_mdhref_counter using the
% logged data and the default harness options:
load_system('sldemo_mdhref_counter');
harnessOpts = slvnvharnessopts
[harnessFilePath] = ...
    slvnvmakeharness('sldemo_mdhref_counter', data, ...
    harnessOpts);
```

See Also

`sldvmakeharness` | `slvnvruncgvtest` | `slvnvruntest` | `slvnvmakeharness`

Introduced in R2010b

slvnvmakeharness

Generate Simulink Verification and Validation harness model

Syntax

```
harnessFilePath = slvnvmakeharness(model)
harnessFilePath = slvnvmakeharness(model, dataFile)
harnessFilePath = slvnvmakeharness(model, dataFile, harnessOpts)
```

Description

`harnessFilePath = slvnvmakeharness(model)` generates a test harness from `model`, which is a handle to a Simulink model or a character vector with the model name. `slvnvmakeharness` returns the path and file name of the generated harness model in `harnessFilePath`. `slvnvmakeharness` creates an empty harness model. The test harness includes one default test case that specifies the default values for all input signals.

`harnessFilePath = slvnvmakeharness(model, dataFile)` generates a test harness from the data file `dataFile`.

`harnessFilePath = slvnvmakeharness(model, dataFile, harnessOpts)` generates a test harness from `model` by using the `dataFile` and `harnessOpts`, which specifies the harness creation options. Requires `' '` for `dataFile` if `dataFile` is not available. The default `dataFile` argument creates a test harness with a single test case with default values for the inputs.

Input Arguments

model — Simulink model
character vector | handle

Simulink model or the model name.

dataFile — Structure created by `slvnvlogsignals` or `slvnvmergedata`
' ' (default) | structure

Contains information about the model, its input and output ports, and any preexisting test signals. This argument can be either the structure itself or the name of the `.mat` file containing this structure. Use this parameter when you have previously logged test data that you want to import into a new test harness.

harnessOpts — Configuration for `slvnvmakeharness`

structure

A structure whose fields specify the configuration for `slvnvmakeharness`.

| 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 you do not specify this option, the <code>slvnvoptions</code> object is used. Also, <code>slvnvmakeharness</code> generates a new harness model and saves it in the MATLAB current folder. Default: <code>''</code> |
| <code>modelRefHarness</code> | Generates the test harness model that includes <code>model</code> in a Model block. When <code>false</code> , the test harness model includes a copy of <code>model</code> . Default: <code>true</code> |
| <code>usedSignalsOnly</code> | When <code>true</code> , the Signal Builder block in the harness model has signals for input signals in the model. You must have the Simulink Design Verifier software and <code>model</code> must be compatible with that software to detect the input signals. Default: <code>false</code> |

Note: To create a default `harnessOpts` object, at the MATLAB command prompt, type:

```
slvnvharnessopts
```

Output Arguments

harnessFilePath — Generated harness model

Character vector

The path and file name of the generated harness model.

Examples

Create a Test Harness Using the Default Options

Create a test harness for the `sldemo_md1ref_house` model using the default options:

```
open_system('sldemo_md1ref_house');  
[harnessfile] = slvnmakeharness('sldemo_md1ref_house', '', harnessOpts);
```

See Also

`slvnharnessopts` | `slvnvmergeharness`

Introduced in R2010b

slvnvmergedata

Combine test data from data files

Syntax

```
merged_data = slvnvmergedata(data1,data2,...)
```

Description

`merged_data = slvnvmergedata(data1,data2,...)` combines two or more test cases and counterexamples `data` into a single test case data structure `merged_data`.

Input Arguments

data — Structure that contains test case or counterexample data
structure

Generated by running `slvnvlogsignals` or by running a Simulink Design Verifier analysis.

Output Arguments

merged_data — The merged test cases or counterexamples
structure

Structure that contains the merged test cases or counterexamples.

Examples

Log Signals and Merge Logged Data

```
% Open the sldemo_md1ref_basic model, which contains three Model blocks
```

```
% that reference the sldemo_md1ref_counter model:
sldemo_md1ref_basic;

% Log the input signals to the three Model blocks:
data1 = slvnlvlogs1gnals('sldemo_md1ref_basic/CounterA');
data2 = slvnlvlogs1gnals('sldemo_md1ref_basic/CounterB');
data3 = slvnlvlogs1gnals('sldemo_md1ref_basic/CounterC');

% Merge the logged data:
merged_data = slvnlvmergedata(data1, data2, data3);

% Simulate the referenced model, sldemo_md1ref_counter, for coverage with
% the merged data and display the coverage results in an HTML file.
open_system('sldemo_md1ref_counter');
runOpts = slvnlvruntestopts;
runOpts.coverageEnabled = true;
[ outData, initialCov ] = slvnlvruntest('sldemo_md1ref_counter', ...
    merged_data, runOpts);
cvhtml('Initial coverage', initialCov);
```

See Also

[slvnlvlogs1gnals](#) | [slvnlvmakeharness](#) | [slvnlvruncgvtest](#) | [slvnlvruntest](#) | [sldvrun](#)

Introduced in R2011a

slvnvmergeharness

Combine test data from harness models

Syntax

```
status = slvnvmergeharness(name, models, initialization_commands)
initialization_commands
slvnvmergeharness
```

Description

`status = slvnvmergeharness(name, models, initialization_commands)` collects the test data and initialization commands from each test harness model and saves them in a handle to the new model.

`initialization_commands` is a cell array of character vectors that are the same length as `models`. It defines parameter settings for the test cases of each test harness model.

`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
character vector

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`.

models — Harness model names

cell array of character vectors

Names of harness models that are inputs to `slvnvmergeharness`.

initialization_commands — Parameter settings for the test cases of each test harness model

cell array of character vectors

Cell array of character vectors that is the same length as `models`.

Output Arguments

status — Status of data and initialization commands getting saved

1 | 0

`slvnvmergeharness` returns a status of 1 if the data and initialization commands are saved in `name`. Otherwise, it returns 0.

Examples

Log Signals and Merge Test Harnesses

```
% Log the input signals to the three Model blocks in the sldemo_mdref_basic example model
% that each reference the same model:
open_system('sldemo_mdref_basic');
data1 = slvnvlogsignals('sldemo_mdref_basic/CounterA');
data2 = slvnvlogsignals('sldemo_mdref_basic/CounterB');
data3 = slvnvlogsignals('sldemo_mdref_basic/CounterC');
open_system('sldemo_mdref_counter');

% Make three test harnesses using the logged signals:
harness1FilePath = slvnvmakeharness('sldemo_mdref_counter', data1);
harness2FilePath = slvnvmakeharness('sldemo_mdref_counter', data2);
harness3FilePath = slvnvmakeharness('sldemo_mdref_counter', data3);
[-, harness1] = fileparts(harness1FilePath);
[-, harness2] = fileparts(harness2FilePath);
[-, harness3] = fileparts(harness3FilePath);
```

```
% Merge the three test harnesses:  
slvnmergeharness('new_harness_model',{harness1, harness2, harness3});
```

See Also

slvnvlogsignals | slvnvmakeharness

Introduced in R2010b

slvnvruncgvtest

Invoke Code Generation Verification (CGV) API and execute model

Syntax

```
cgvObject = slvnvruncgvtest(model, dataFile)
cgvObject = slvnvruncgvtest(model, dataFile, runOpts)
```

Description

`cgvObject = slvnvruncgvtest(model, dataFile)` invokes the Code Generation Verification (CGV) API methods and executes the `model` by 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` by 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 — Model to execute

character vector

Name of the Simulink model that you execute.

dataFile — Input data

structure | character vector

Name of the data file or a structure that contains the input data. Generate data by either:

- Using the Simulink Design Verifier software to analyze the model.

- Using the `slvnvlogssignals` function.

runOpts — Specify the configuration of `slvnvruncgvtest` structure

The fields of `runOpts` specify the configuration of `slvnvruncgvtest`.

| 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>slvnvruncgvtest</code> simulates all test cases.</p> |
| <code>allowCopyModel</code> | <p>If you have not configured your model to execute test cases with the CGV API, this field specifies creating and configuring the model.</p> <p>If <code>true</code> and you have not configured your <code>model</code> to execute test cases with the CGV API, <code>slvnvruncgvtest</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>slvnvruncgvtest</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"> • <code>'topmodel'</code> (default) • <code>'modelblock'</code> |
| <code>cgvConn</code> | <p>Specifies mode of execution for CGV:</p> <ul style="list-style-type: none"> • <code>'sim'</code> (default) • <code>'sil'</code> • <code>'pil'</code> |

Note: `runOpts = slvnvruntimeopts('cgv')` returns a `runOpts` structure with the default values for each field.

Output Arguments

cgvObject — Object created by `slvnvruncgv` test during the execution of `model`

`cgv.CGV` object

`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>logout_slvnvruncgvtest</code> | Signal logging data for: <ul style="list-style-type: none"> • Signals connected to outports • Signals that are configured for logging data on the model |

Examples

Log Signals, Run Tests, and Compare Results by Using the CGV API

```
% Open the sldemo_mdref_basic example model and log the input signals to the CounterA Model block:
open_system('sldemo_mdref_basic');
load_system('sldemo_mdref_counter');
loggedData = slvnvlogsignals('sldemo_mdref_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 = slvnvruntimeopts('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 = slvnvruncgvttest('sldemo_md1ref_counter', loggedData, runOpts);
runOpts.cgvConn = 'sil';
cgvObjectSil = slvnvruncgvttest('sldemo_md1ref_counter', loggedData, runOpts);

% Use the CGV API to compare the results of the first test case:
simout = cgvObjectSim.getOutputData(1);
silout = cgvObjectSil.getOutputData(1);
[matchNames, ~, mismatchNames, ~ ] = cgv.CGV.compare(simout, silout);
fprintf('\nTest Case:  %d Signals match, %d Signals mismatch', ...
        length(matchNames), length(mismatchNames));
```

Tips

To run `slvnvruncgvttest`, you must have the Embedded Coder[®] software.

If your model has parameters that are not configured for executing test cases with the CGV API, `slvnvruncgvttest` reports warnings about the invalid parameters. If you see these warnings, do one of the following:

- Modify the invalid parameters and rerun `slvnvruncgvttest`.
- Set `allowCopyModel` in `runOpts` to be `true` and rerun `slvnvruncgvttest`.
`slvnvruncgvttest` makes a copy of your model configured for executing test cases, and invokes the CGV API.

See Also

`cgv.CGV` | `slvnvlogssignals` | `slvnvruntest` | `slvnvruntestopts`

Introduced in R2010b

slvnvruntime

Simulate model by 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` by using all the test cases in `dataFile`. `outData` is an array of `Simulink.SimulationOutput` class (`Simulink`) objects. Each array element contains the simulation output data of the corresponding test case.

`outData = slvnvruntime(model, dataFile, runOpts)` simulates `model` by using all the test cases in `dataFile`. `runOpts` defines the options for simulating the test cases.

`[outData, covData] = slvnvruntime(model, dataFile, runOpts)` simulates `model` by 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 `cvdata` object `covData`.

Input Arguments

model — Simulink model that you simulate

character vector | handle

The Simulink model to simulate.

dataFile — Input data

character vector | structure

Name of the data file or structure that contains the input data. You can generate `dataFile` with Simulink Design Verifier software, or by running the `slvnvlogsignals` function.

runOpts — Configuration specification

structure

A structure whose fields specify the configuration of `slvnvrntest`.

| Field | Description |
|------------------------------|---|
| <code>testIdx</code> | Test case index array to simulate from <code>dataFile</code> . If <code>testIdx</code> is <code>[]</code> , <code>slvnvrntest</code> simulates all test cases. Default: <code>[]</code> |
| <code>coverageEnabled</code> | If <code>true</code> , specifies that the Simulink Verification and Validation software collects model coverage data during simulation. Default: <code>false</code> |
| <code>coverageSetting</code> | <code>cvtest</code> object for collecting model coverage. If <code>[]</code> , <code>slvnvrntest</code> uses the existing coverage settings for <code>model</code> . Default: <code>[]</code> |

Output Arguments

outData — Output objects obtained after simulating the test cases

array of `Simulink.SimulationOutput` objects

Each `Simulink.SimulationOutput` object has the following fields.

| Field Name | Description |
|-------------------------------|--------------------|
| <code>tout_slvnvrntest</code> | Simulation time |
| <code>xout_slvnvrntest</code> | State data |
| <code>yout_slvnvrntest</code> | Output signal data |

| Field Name | Description |
|--------------------|--|
| logout_slvnvrntest | Signal logging data for: <ul style="list-style-type: none"> • Signals connected to outports • Signals that are configured for logging on the model |

covData — Object that contains model coverage data

cvdata object

cvdata object that contains the model coverage data collected during simulation.

Examples

Analyze the Model and Examine the Output Data with the Simulation Data Inspector

```
% 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 = slvnvrntestopts;
runOpts.coverageEnabled = true;
open_system('sldemo_mdref_counter');
[ outData ] = slvnvrntest('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('logout_slvnvrntest')});
Simulink.sdi.view;
```

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 by 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`

Introduced in R2010b

slvnvruntestopts

Generate simulation or execution options for `slvnvruntest` or `slvnvruncgvttest`

Syntax

```
runOpts = slvnvruntestopts  
runOpts = slvnvruntestopts('cgv')
```

Description

`runOpts = slvnvruntestopts` generates a `runOpts` structure for `slvnvruntest`.

`runOpts = slvnvruntestopts('cgv')` generates a `runOpts` structure for `slvnvruncgvttest`.

Output Arguments

runOpts — Configuration specification of `slvnvruntest` or `slvnvruncgvttest`
structure

`runOpts` can have the following fields. If you do not specify a field, `slvnvruncgvttest` 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>coverageEnabled</code> | Available only for <code>slvnvruntest</code> . If <code>true</code> , <code>slvnvruntest</code> collects model coverage data during simulation. Default: <code>false</code> |

| Field Name | Description |
|-----------------|---|
| coverageSetting | <p>Available only for <code>slvnvruntest</code>.</p> <p><code>cvtest</code> object for collecting model coverage.</p> <p>If <code>coverageSetting</code> is <code>[]</code>, <code>slvnvruntest</code> uses the coverage settings for the model specified in the call to <code>slvnvruntest</code>.</p> <p>Default: <code>[]</code></p> |
| allowCopyModel | <p>Available only for <code>slvnvruncgvtest</code>.</p> <p>If you have not configured your model to execute test cases with the CGV API, this field specifies creating and configuring the model.</p> <p>If <code>true</code> and you have not configured the model to execute test cases with the CGV API, <code>slvnvruncgvtest</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>slvnvruncgvtest</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> |

| Field Name | Description |
|-------------|--|
| 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"> • 'topmodel' • 'modelblock' <p>Default: 'topmodel'</p> |
| cgvConn | <p>Available only for <code>slvnvruncgvttest</code>.</p> <p>Specifies mode of execution for CGV:</p> <ul style="list-style-type: none"> • 'sim' • 'sil' • 'pil' <p>Default: 'sim'</p> |

Examples

Create runOpts Objects for `slvnvrunttest` and `slvnvruncgvttest`

```
% Create runOpts objects for slvnvrunttest
runtest_opts = slvnvrunttestopts;

% Create runOpts objects for slvnvruncgvttest
runcgvttest_opts = slvnvrunttestopts('cgv')
```

Alternatives

Create a `runOpts` object at the MATLAB command line.

See Also

`slvnvruncgvttest` | `slvnvrunttest`

Introduced in R2010b

slwebview_cov

Export Simulink models to Web views with coverage

Syntax

```
filename = slwebview_cov(sysname)
filename = slwebview_cov(sysname,Name,Value)
```

Description

`filename = slwebview_cov(sysname)` exports the system `sysname` and its children to a web page `filename` with contextual coverage information for the system displayed on a separate panel of the layered model structure Web view.

`filename = slwebview_cov(sysname,Name,Value)` uses additional options specified by one or more `Name,Value` pair arguments.

Note: You can use `slwebview_cov` only if you have also installed Simulink Report Generator™.

Examples

Export All Layers

Export all the layers (including libraries and masks) from the system `gcs` to the file `filename`

```
filename = slwebview_cov(gcs, 'LookUnderMasks', 'all', 'FollowLinks', 'on')
```

Input Arguments

sysname — The system to export to a Web view file

character vector containing the path to the system | handle to a subsystem or block diagram | handle to a chart or subchart

Exports the specified system or subsystem and its child systems to a Web view file, with contextual coverage information for the system displayed on a separate panel of the layered model structure Web view. By default, child systems of the `sysname` system are also exported. Use the `SearchScope` name-value pair to export other systems, in relation to `sysname`.

Example: `'sysname'`

Name-Value Pair Arguments

Specify optional comma-separated pairs of `Name`, `Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside single quotes (`' '`). You can specify several name and value pair arguments in any order as `Name1,Value1,...,NameN,ValueN`.

Example:

'SearchScope' — Systems to export, relative to the `sysname` system

`'CurrentAndBelow'` (default) | `'Current'` | `'CurrentAndAbove'` | `'All'`

`'CurrentAndBelow'` exports the Simulink system or the Stateflow chart specified by `sysname` and all systems or charts that it contains.

`'Current'` exports only the Simulink system or the Stateflow chart specified by `sysname`.

`'CurrentAndAbove'` exports the Simulink system or the Stateflow chart specified by the `sysname` and all systems or charts that contain it.

`'All'` exports all Simulink systems or Stateflow charts in the model that contains the system or chart specified by `sysname`.

Data Types: `char`

'LookUnderMasks' — Specifies whether to export the ability to interact with masked blocks

`'none'` (default) | `'all'`

`'none'` does not export masked blocks in the Web view. Masked blocks are included in the exported systems, but you cannot access the contents of the masked blocks.

`'all'` exports all masked blocks.

Data Types: `char`

'FollowLinks' — Specifies whether to follow links into library blocks

'off' (default) | 'on'

'off' does not allow you to follow links into library blocks in a Web view.

'on' allows you to follow links into library blocks in a Web view.

Data Types: char

'FollowModelReference' — Specifies whether to access referenced models in a Web view

'off' (default) | 'on'

'off' does not allow you to access referenced models in a Web view.

'on' allows you to access referenced models in a Web view.

Data Types: char

'ViewFile' — Specifies whether to display the Web view in a Web browser when you export the Web view

'on' (default) | 'off'

'on' displays the Web view in a Web browser when you export the Web view.

'off' does not display the Web view in a Web browser when you export the Web view.

Data Types: char

'ShowProgressBar' — Specifies whether to display the status bar when you export a Web view

'on' (default) | 'off'

'on' displays the status bar when you export a Web view.

'off' does not display the status bar when you export a Web view.

Data Types: char

'CovData' — cvdata objects to use

cvdata

The coverage data to use, specified as the comma-separated pair consisting of 'CovData' and the cvdata objects to use.

Example: 'CovData', covdata

Output Arguments

filename — The name of the HTML file for displaying the Web view

character vector

Reports the name of the HTML file for displaying the Web view. Exporting a Web view creates the supporting files, in a folder.

Tips

A Web view is an interactive rendition of a model that you can view in a Web browser. You can navigate a Web view hierarchically to examine specific subsystems and to see properties of blocks and signals.

You can use Web views to share models with people who do not have Simulink installed.

Web views require a Web browser that supports Scalable Vector Graphics (SVG).

See Also

See Also

slwebview_req

Introduced in R2015a

slwebview_req

Export Simulink system to Web views with requirements

Syntax

```
filename = slwebview_req(sysname)
filename = slwebview_req(sysname,Name,Value)
```

Description

`filename = slwebview_req(sysname)` exports the system `sysname` and its children to a web page `filename` with contextual requirements information for the system displayed on a separate panel of the layered model structure Web view.

`filename = slwebview_req(sysname,Name,Value)` uses additional options specified by one or more `Name,Value` pair arguments.

Note: You can use `slwebview_req` only if you have also installed Simulink Report Generator.

Examples

Export All Layers

Export all the layers (including libraries and masks) from the system `gcs` to the file `filename`

```
filename = slwebview_req(gcs, 'LookUnderMasks', 'all', 'FollowLinks', 'on')
```

Input Arguments

sysname — The system to export to a Web view file

character vector containing the path to the system | handle to a subsystem or block diagram | handle to a chart or subchart

Exports the specified system or subsystem and its child systems to a Web view file, with contextual requirements information for the system displayed on a separate panel of the layered model structure Web view. By default, child systems of the `sysname` system are also exported. Use the `SearchScope` name-value pair to export other systems, in relation to `sysname`.

Example: `'sysname'`

Name-Value Pair Arguments

Specify optional comma-separated pairs of `Name`, `Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside single quotes (`' '`). You can specify several name and value pair arguments in any order as `Name1, Value1, ..., NameN, ValueN`.

Example:

'SearchScope' — Systems to export, relative to the sysname system

`'CurrentAndBelow'` (default) | `'Current'` | `'CurrentAndAbove'` | `'All'`

`'CurrentAndBelow'` exports the Simulink system or the Stateflow chart specified by `sysname` and all systems or charts that it contains.

`'Current'` exports only the Simulink system or the Stateflow chart specified by `sysname`.

`'CurrentAndAbove'` exports the Simulink system or the Stateflow chart specified by the `sysname` and all systems or charts that contain it.

`'All'` exports all Simulink systems or Stateflow charts in the model that contains the system or chart specified by `sysname`.

Data Types: `char`

'LookUnderMasks' — Specifies whether to export the ability to interact with masked blocks

`'none'` (default) | `'all'`

`'none'` does not export masked blocks in the Web view. Masked blocks are included in the exported systems, but you cannot access the contents of the masked blocks.

`'all'` exports all masked blocks.

Data Types: `char`

'FollowLinks' — Specifies whether to follow links into library blocks

'off' (default) | 'on'

'off' does not allow you to follow links into library blocks in a Web view.

'on' allows you to follow links into library blocks in a Web view.

Data Types: char

'FollowModelReference' — Specifies whether to access referenced models in a Web view

'off' (default) | 'on'

'off' does not allow you to access referenced models in a Web view.

'on' allows you to access referenced models in a Web view.

Data Types: char

'ViewFile' — Specifies whether to display the Web view in a Web browser when you export the Web view

'on' (default) | 'off'

'on' displays the Web view in a Web browser when you export the Web view.

'off' does not display the Web view in a Web browser when you export the Web view.

Data Types: char

'ShowProgressBar' — Specifies whether to display the status bar when you export a Web view

'on' (default) | 'off'

'on' displays the status bar when you export a Web view.

'off' does not display the status bar when you export a Web view.

Data Types: char

Output Arguments

filename — The name of the HTML file for displaying the Web view

character vector

Reports the name of the HTML file for displaying the Web view. Exporting a Web view creates the supporting files, in a folder.

Tips

A Web view is an interactive rendition of a model that you can view in a Web browser. You can navigate a Web view hierarchically to examine specific subsystems and to see properties of blocks and signals.

You can use Web views to share models with people who do not have Simulink installed.

Web views require a Web browser that supports Scalable Vector Graphics (SVG).

See Also

See Also

slwebview_cov

Introduced in R2015a

tableinfo

Retrieve lookup table coverage information from `cvdata` object

Syntax

```
coverage = tableinfo(cvdo, object)
coverage = tableinfo(cvdo, object, ignore_descendants)
[coverage, exeCounts] = tableinfo(cvdo, object)
[coverage, exeCounts, brkEquality] = tableinfo(cvdo, object)
```

Description

`coverage = tableinfo(cvdo, object)` returns lookup table coverage results from the `cvdata` object `cvdo` for the model component `object`.

`coverage = tableinfo(cvdo, object, ignore_descendants)` returns lookup table coverage results for `object`, depending on the value of `ignore_descendants`.

`[coverage, exeCounts] = tableinfo(cvdo, object)` returns lookup table coverage results and the execution count for each interpolation/extrapolation interval in the lookup table block `object`.

`[coverage, exeCounts, brkEquality] = tableinfo(cvdo, object)` returns lookup table coverage results, the execution count for each interpolation/extrapolation interval, and the execution counts for breakpoint equality.

Input Arguments

cvdo

`cvdata` object

ignore_descendants

Logical value specifying whether to ignore the coverage of descendant objects

1 — Ignore coverage of descendant objects

0 — Collect coverage for descendant objects

object

Full path or handle to a lookup table block or a model containing a lookup table block.

Output Arguments

brkEquality

A cell array containing vectors that identify the number of times during simulation that the lookup table block input was equivalent to a breakpoint value. Each vector represents the breakpoints along a different lookup table dimension.

coverage

The value of `coverage` is a two-element vector of form `[covered_intervals total_intervals]`, the elements of which are:

| | |
|--------------------------------|---|
| <code>covered_intervals</code> | Number of interpolation/extrapolation intervals satisfied for <code>object</code> |
| <code>total_intervals</code> | Total number of interpolation/extrapolation intervals for <code>object</code> |

`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 = cvsimsim(testObj)
blk_handle = get_param([mdl, '/Gain/Gain Table'], 'Handle');
%Retrieve l/u table coverage
cov = tableinfo(data, blk_handle)
%Percent MC/DC outcomes covered
percent_cov = 100 * cov(1) / cov(2)
```

Alternatives

Use the coverage settings to collect lookup table coverage for a model:

- 1 Open the model.
- 2 In the Model Editor, select **Analysis > Coverage > Settings**.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Under **Coverage metrics**, select **Lookup Table**.
- 5 On the **Coverage > Results** pane, specify the output you need.
- 6 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 7 Simulate the model and review the results.

See Also

complexityinfo | cvsimsim | conditioninfo | decisioninfo | getCoverageInfo | mcdcinfo | overflowsaturationinfo | sigrangeinfo | sigsizeinfo

Topics

“Lookup Table Coverage”

Introduced in R2006b

Attributes property

Class: ModelAdvisor.ListViewParameter

Package: ModelAdvisor

Attributes to display in Model Advisor Report Explorer

Values

Cell array

Default: {} (empty cell array)

Description

The **Attributes** property specifies the attributes to display in the center pane of the Model Advisor Results Explorer.

Examples

```
% define list view parameters
myLVParam = ModelAdvisor.ListViewParameter;
myLVParam.Name = 'Invalid font blocks'; % the name appeared at pull down filter
myLVParam.Data = get_param(searchResult,'object');
myLVParam.Attributes = {'FontName'}; % name is default property
```

CallbackContext property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Specify when to run check

Values

'PostCompile'

'None' (default)

Description

The `CallbackContext` property specifies the context for checking the model or subsystem.

| | |
|---------------|--|
| 'None' | No special requirements for the model before checking. |
| 'Postcompile' | The model must be compiled. |

CallbackHandle property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Callback function handle for check

Values

Function handle.

An empty handle [] is the default.

Description

The `CallbackHandle` property specifies the handle to the check callback function.

CallbackStyle property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Callback function type

Values

'StyleOne' (default)

'StyleTwo'

'StyleThree'

Description

The `CallbackStyle` property specifies the type of the callback function.

| | |
|--------------|--|
| 'StyleOne' | Simple check callback function |
| 'StyleTwo' | Detailed check callback function |
| 'StyleThree' | Check callback function with hyperlinked results |

EmitInputParametersToReport property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Display check input parameters in the Model Advisor report

Values

'true' (default)

'false'

Description

The `EmitInputParametersToReport` property specifies the display of check input parameters in the Model Advisor report.

| | |
|---------|---|
| 'true' | Display check input parameters in the Model Advisor report |
| 'false' | Do not display check input parameters in the Model Advisor report |

Data property

Class: ModelAdvisor.ListViewParameter

Package: ModelAdvisor

Objects in Model Advisor Result Explorer

Values

Array of Simulink objects

Default: [] (empty array)

Description

The **Data** property specifies the objects displayed in the Model Advisor Result Explorer.

Examples

```
% define list view parameters
myLVParam = ModelAdvisor.ListViewParameter;
myLVParam.Name = 'Invalid font blocks'; % the name appeared at pull down filter
myLVParam.Data = get_param(searchResult,'object');
```

Description property

Class: ModelAdvisor.Action

Package: ModelAdvisor

Message in **Action** box

Values

Character vector

Default: ' ' (empty character vector)

Description

The **Description** property specifies the message displayed in the Action box.

Examples

```
% define action (fix) operation
myAction = ModelAdvisor.Action;
%Specify a callback function for the action
myAction.setCallbackFcn(@sampleActionCB);
myAction.Name='Fix block fonts';
myAction.Description=...
    'Click the button to update all blocks with specified font';
```

Description property

Class: ModelAdvisor.FactoryGroup

Package: ModelAdvisor

Description of folder

Values

Character vector

Default: '' (empty character vector)

Description

The `Description` property provides information about the folder. Details about the folder are displayed in the right pane of the Model Advisor.

Examples

```
% --- sample factory group
rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');
rec.Description='Sample Factory Group';
```

Description property

Class: ModelAdvisor.Group

Package: ModelAdvisor

Description of folder

Values

Character vector

Default: '' (empty character vector)

Description

The `Description` property provides information about the folder. Details about the folder are displayed in the right pane of the Model Advisor.

Examples

```
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');  
MAG.Description='This is my group';
```

Description property

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Description of input parameter

Values

Character vector.

Default: '' (empty character vector)

Description

The `Description` property specifies a description of the input parameter. Details about the check are displayed in the right pane of the Model Advisor.

Examples

```
% define input parameters
inputParam2 = ModelAdvisor.InputParameter;
inputParam2.Name = 'Standard font size';
inputParam2.Value='12';
inputParam2.Type='String';
inputParam2.Description='sample tooltip';
```


Description property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Description of task

Values

Character vector

Default: '' (empty character vector)

Description

The **Description** property is a description of the task that the Model Advisor displays in the **Analysis** box.

When adding checks as tasks, the Model Advisor uses the task **Description** property instead of the check **TitleTips** property.

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.DisplayName='Example task 1';  
MAT1.Description='This is the first example task.'
```

```
MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');  
MAT2.DisplayName='Example task 2';  
MAT2.Description='This is the second example task.'
```

```
MAT3 = ModelAdvisor.Task('com.mathworks.sample.TaskSample3');  
MAT3.DisplayName='Example task 3';  
MAT3.Description='This is the third example task.'
```

DisplayName property

Class: ModelAdvisor.FactoryGroup

Package: ModelAdvisor

Name of folder

Values

Character vector

Default: ' ' (empty character vector)

Description

The `DisplayName` specifies the name of the folder that is displayed in the Model Advisor.

Examples

```
% --- sample factory group
rec = ModelAdvisor.FactoryGroup('com.mathworks.sample.factorygroup');
rec.DisplayName='Sample Factory Group';
```

DisplayName property

Class: ModelAdvisor.Group

Package: ModelAdvisor

Name of folder

Values

Character vector

Default: ' ' (empty character vector)

Description

The `DisplayName` specifies the name of the folder that is displayed in the Model Advisor.

Examples

```
MAG = ModelAdvisor.Group('com.mathworks.sample.GroupSample');  
MAG.DisplayName='My Group';
```

DisplayName property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Name of task

Values

Character vector

Default: '' (empty character vector)

Description

The `DisplayName` property specifies the name of the task. The Model Advisor displays each custom task in the tree using the name of the task. Therefore, you should specify a unique name for each task. When you specify the same name for multiple tasks, the Model Advisor generates a warning.

When adding checks as tasks, the Model Advisor uses the task `DisplayName` property instead of the check `Title` property.

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.DisplayName='Example task with input parameter and auto-fix ability';
```

```
MAT2 = ModelAdvisor.Task('com.mathworks.sample.TaskSample2');  
MAT2.DisplayName='Example task 2';
```

```
MAT3 = ModelAdvisor.Task('com.mathworks.sample.TaskSample3');  
MAT3.DisplayName='Example task 3';
```

Enable property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Indicate whether user can enable or disable check

Values

true (default)

false

Description

The `Enable` property specifies whether the user can enable or disable the check.

| | |
|-------|-------------------------------|
| true | Display the check box control |
| false | Hide the check box control |

Enable property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Indicate if user can enable and disable task

Values

true (default)

false

Description

The `Enable` property specifies whether the user can enable or disable a task.

true (default)

Display the check box control for task

false

Hide the check box control for task

When adding checks as tasks, the Model Advisor uses the task `Enable` property instead of the check `Enable` property.

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.Enable = false;
```

Entries property

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Drop-down list entries

Values

Depends on the value of the `Type` property.

Description

The `Entries` property is valid only when the `Type` property is one of the following:

- Enum
- ComboBox
- PushButton

Examples

```
inputParam3 = ModelAdvisor.InputParameter;  
inputParam3.Name='Valid font';  
inputParam3.Type='Combobox';  
inputParam3.Description='sample tooltip';  
inputParam3.Entries={'Arial', 'Arial Black'};
```

ID property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Identifier for check

Values

Character vector

Default: '' (empty character vector)

Description

The ID property specifies a permanent, unique identifier for the check. Note the following about the ID property:

- You must specify this property.
- The value of ID must remain constant.
- The Model Advisor generates an error if ID is not unique.
- Tasks and factory group definitions must refer to checks by ID.

ID property

Class: ModelAdvisor.FactoryGroup

Package: ModelAdvisor

Identifier for folder

Values

Character vector

Description

The ID property specifies a permanent, unique identifier for the folder.

Note:

- You must specify this field.
 - The value of ID must remain constant.
 - The Model Advisor generates an error if ID is not unique.
 - Group definitions must refer to other groups by ID.
-

ID property

Class: ModelAdvisor.Group

Package: ModelAdvisor

Identifier for folder

Values

Character vector

Description

The ID property specifies a permanent, unique identifier for the folder.

Note:

- You must specify this field.
 - The value of ID must remain constant.
 - The Model Advisor generates an error if ID is not unique.
 - Group definitions must refer to other groups by ID.
-

ID property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Identifier for task

Values

Character vector

Default: '' (empty character vector)

Description

The ID property specifies a permanent, unique identifier for the task.

Note:

- The Model Advisor automatically assigns a unique identifier to **ID** if you do not specify it.
 - The value of **ID** must remain constant.
 - The Model Advisor generates an error if **ID** is not unique.
 - Group definitions must refer to tasks using **ID**.
-

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.ID='Task_ID_1234';
```

LicenseName property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Product license names required to display and run check

Values

Cell array of product license names

{ }(empty cell array) (default)

Description

The `LicenseName` property specifies a cell array of names for product licenses required to display and run the check.

When the Model Advisor starts, it tests whether the product license exists. If you do not meet the license requirements, the Model Advisor does not display the check.

The Model Advisor performs a checkout of the product licenses when you run the custom check. If you do not have the product licenses available, you see an error message that the required license is not available.

Tip: To find the text for license strings, type `help license` at the MATLAB command line.

LicenseName property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Product license names required to display and run task

Values

Cell array of product license names

Default: {} (empty cell array)

Description

The `LicenseName` property specifies a cell array of names for product licenses required to display and run the check.

When the Model Advisor starts, it tests whether the product license exists. If you do not meet the license requirements, the Model Advisor does not display the check.

The Model Advisor performs a checkout of the product licenses when you run the custom check. If you do not have the product licenses available, you see an error message that the required license is not available.

If you specify `ModelAdvisor.Check.LicenseName`, the Model Advisor displays the check when the union of both properties is true.

Tip: To find the text for license strings, type `help license` at the MATLAB command line.

ListViewVisible property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Status of **Explore Result** button

Values

false (default)

true

Description

The `ListViewVisible` property is a Boolean value that sets the status of the **Explore Result** button.

| | |
|-------|---|
| true | Display the Explore Result button. |
| false | Hide the Explore Result button. |

Examples

```
% add 'Explore Result' button  
rec.ListViewVisible = true;
```

MAObj property

Class: ModelAdvisor.FactoryGroup

Package: ModelAdvisor

Model Advisor object

Values

Handle to a `Simulink.ModelAdvisor` object

Description

The `MAObj` property specifies a handle to the current Model Advisor object.

MAObj property

Class: ModelAdvisor.Group

Package: ModelAdvisor

Model Advisor object

Values

Handle to Simulink.ModelAdvisor object

Description

The MAObj property specifies a handle to the current Model Advisor object.

MAObj property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Model Advisor object

Values

Handle to a `Simulink.ModelAdvisor` object

Description

The MAObj property specifies the current Model Advisor object.

When adding checks as tasks, the Model Advisor uses the task MAObj property instead of the check MAObj property.

name property

Class: cv.cvdatagroup

Package: cv

cv.cvdatagroup object name

Values

name

Description

The name property specifies the name of the cv.cvdatagroup object.

Examples

```
cvdg = cvsim(topModelName);  
cvdg.name = 'My_Data_Group';
```

Name property

Class: ModelAdvisor.Action

Package: ModelAdvisor

Action button label

Values

Character vector

Default: '' (empty character vector)

Description

The `Name` property specifies the label for the action button. This property is required.

Examples

```
% define action (fix) operation
myAction = ModelAdvisor.Action;
%Specify a callback function for the action
myAction.setCallbackFcn(@sampleActionCB);
myAction.Name='Fix block fonts';
```

Name property

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Input parameter name

Values

Character vector.

Default: '' (empty character vector)

Description

The Name property specifies the name of the input parameter in the custom check.

Examples

```
inputParam2 = ModelAdvisor.InputParameter;  
inputParam2.Name = 'Standard font size';  
inputParam2.Value='12';  
inputParam2.Type='String';  
inputParam2.Description='sample tooltip';
```

Name property

Class: ModelAdvisor.ListViewParameter

Package: ModelAdvisor

Drop-down list entry

Values

Character vector

Default: '' (empty character vector)

Description

The **Name** property specifies an entry in the **Show** drop-down list in the Model Advisor Result Explorer.

Examples

```
% define list view parameters
myLVParam = ModelAdvisor.ListViewParameter;
myLVParam.Name = 'Invalid font blocks'; % the name appeared at pull down filter
```

Result property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Results cell array

Values

Cell array

Default: {} (empty cell array)

Description

The **Result** property specifies the cell array for storing the results that are returned by the callback function specified in **CallbackHandle**.

Tip: To set the icon associated with the check, use the **Simulink.ModelAdvisor** **setCheckResultStatus** and **setCheckErrorSeverity** methods.

supportExclusion property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Set to support exclusions

Values

Boolean value specifying that the check supports exclusions.

true The check supports exclusions.

false (default). The check does not support exclusions.

Description

The supportExclusion property specifies whether the check supports exclusions.

| | |
|---------|------------------------------------|
| 'true' | Check supports exclusions. |
| 'false' | Check does not support exclusions. |

Examples

```
% specify that a check supports exclusions
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');
rec.supportExclusion = true;
```

SupportLibrary property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Set to support library models

Values

Boolean value specifying that the check supports library models.

`true`. The check supports library models.

`false` (default). The check does not support library models.

Description

The `SupportLibrary` property specifies whether the check supports library models.

| | |
|----------------------|--|
| <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

Character vector

Default: '' (empty character vector)

Description

The **Title** property specifies the name of the check in the Model Advisor. The Model Advisor displays each custom check in the tree using the title of the check. Therefore, you should specify a unique title for each check. When you specify the same title for multiple checks, the Model Advisor generates a warning.

Examples

```
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');  
rec.Title = 'Check Simulink block font';
```

TitleTips property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Description of check

Values

Character vector

Default: '' (empty character vector)

Description

The `TitleTips` property specifies a description of the check. Details about the check are displayed in the right pane of the Model Advisor.

Examples

```
rec = ModelAdvisor.Check('com.mathworks.sample.Check1');  
rec.Title = 'Check Simulink block font';  
rec.TitleTips = 'Example style three callback';
```

Type property

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Input parameter type

Values

character vector

Default: ''

Description

The **Type** property specifies the type of input parameter.

Use the **Type** property with the **Value** and **Entries** properties to define input parameters.

Valid values are listed in the following table.

| Type | Data Type | Default Value | Description |
|----------|------------|-------------------------|--|
| Bool | Boolean | false | A check box |
| ComboBox | Cell array | First entry in the list | A drop-down menu <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 | Character vector | ' ' | A text box |

Examples

```
% define input parameters
inputParam1 = ModelAdvisor.InputParameter;
inputParam1.Name = 'Skip font checks.';
inputParam1.Type = 'Bool';
inputParam1.Value = false;
```

validate

Class: Advisor.authoring.DataFile

Package: Advisor.authoring

Validate XML data file used for model configuration check

Syntax

```
msg = Advisor.authoring.DataFile.validate(dataFile)
```

Description

`msg = Advisor.authoring.DataFile.validate(dataFile)` validates the syntax of the XML data file used for model configuration checks.

Input Arguments

`dataFile` XML data file name (character vector)

Examples

```
dataFile = 'myDataFile.xml';  
msg = Advisor.authoring.DataFile.validate(dataFile);  
  
if isempty(msg)  
    disp('Data file passed the XSD schema validation.');
```

```
else  
    disp(msg);  
end
```

See Also

`Advisor.authoring.CustomCheck` |

`Advisor.authoring.generateConfigurationParameterDataFile`

Topics

“Create Check for Model Configuration Parameters”

Value property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Status of check

Values

'true' (default)

'false'

Description

The **Value** property specifies the initial status of the check. When you use the **Value** property to specify the initial status of the check, you enable or disable **Run This Check** in the Model Advisor window.

If you want to specify the initial status of a check in the **By Product** folder, before starting Model Advisor, make sure `ModelAdvisor.Preferences.DeselectByProduct` is `false`.

'true' Check is enabled

'false' Check is disabled

Examples

```
% hide all checks that do not belong to Demo group
if ~(strcmp(checkCellArray{i}.Group, 'Demo'))
    checkCellArray{i}.Visible = false;
    checkCellArray{i}.Value = false;
end
```

See Also

See Also

ModelAdvisor.Preferences

Value property

Class: ModelAdvisor.InputParameter

Package: ModelAdvisor

Value of input parameter

Values

Depends on the `Type` property.

Description

The `Value` property specifies the initial value of the input parameter. This property is valid only when the `Type` property is one of the following:

- 'Bool'
- 'String'
- 'Enum'
- 'ComboBox'

Examples

```
% define input parameters
inputParam1 = ModelAdvisor.InputParameter;
inputParam1.Name = 'Skip font checks.';
inputParam1.Type = 'Bool';
inputParam1.Value = false;
```


Value property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Status of task

Values

'true' (default) — Initial status of task is enabled

'false' — Initial status of task is disabled

Description

The Value property indicates the initial status of a task—whether it is enabled or disabled.

When adding checks as tasks, the Model Advisor uses the task Value property instead of the check Value property.

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.Value = 'false';
```

slcovmex

Build coverage-compatible MEX-function from C/C++ code

Syntax

```
slcovmex(sourceFile1,...,sourceFileN)
slcovmex(sourceFile1,...,sourceFileN,-sldv)
slcovmex(sourceFile1,...,sourceFileN,Name,Value)
slcovmex(argumentSet1,...,argumentSetN)
```

Description

`slcovmex(sourceFile1,...,sourceFileN)` compiles level 2 C/C++ MEX S-Function to work with coverage.

`slcovmex(sourceFile1,...,sourceFileN,-sldv)` compiles level 2 C/C++ MEX S-Function to work with coverage, and with support enabled for Simulink Design Verifier.

`slcovmex(sourceFile1,...,sourceFileN,Name,Value)` uses additional options specified by one or more `Name,Value` pair arguments.

`slcovmex(argumentSet1,...,argumentSetN)` combines several `mex` function calls, each with one set of arguments.

Input Arguments

sourceFile1,...,sourceFileN — One or more file names

character vectors

Comma-separated source file names with each name specified as a character vector.

If the files are not in the current folder, the file names must include the full path or relative path. Use `pwd` to find the current folder and `cd` to change the current folder.

Example: `'file1.c','file1.c','file2.c'`

argumentSet1, ..., argumentSetN — One or more sets of mex arguments

Cell arrays of character vectors

Comma-separated mex argument sets, with each set specified as a cell array.

If you invoke mex multiple times, you can invoke slcovmex once and pass the arguments for each mex invocation as a cell array of character vectors.

For example, if you use the following sequence of mex commands:

```
mex -c file1.c
mex -c file2.c
mex file1.o file2.o -output sfcnOutput
```

You can replace the sequence with one slcovmex invocation:

```
slcovmex({'-c', 'file1.c'}, {'-c', 'file2.c'}, {'file1.o', 'file2.o',
'-output', 'sfcnOutput'})
```

Example: {'-c', 'file1.c'}, {'-c', 'file2.c'}, {'file1.o', 'file2.o', '-output', 'sfcnOutput'}

-s1dv — Option to enable support for Simulink Design Verifier

character vector

Option to enable support for your compiled MEX-function in Simulink Design Verifier.

Name-Value Pair Arguments

Specify optional comma-separated pairs of Name, Value arguments. Name is the argument name and Value is the corresponding value. Name must appear inside single quotes (' '). You can specify several name and value pair arguments in any order as Name1, Value1, ..., NameN, ValueN.

Example: You can use all the name-value pair arguments that are allowed for the mex function. In addition, you can use the following options that are specific to model coverage.

'-ifile' — File ignored for coverage

character vector

File name, specified as a character vector.

Example: 'myFile.c'

'-ifcn' — Function ignored for coverage

character vector

Function name, specified as a character vector.

Example: 'myFunc'

'-idir' — Folder ignored for coverage

character vector

Folder name, specified as a character vector.

All files in the folder are ignored for coverage.

Example: 'C:\Libraries\'

See Also

Topics

“Basic C MEX S-Function” (Simulink)

“Templates for C S-Functions” (Simulink)

“Coverage for C and C++ S-Functions”

“View Coverage Results for C/C++ Code in S-Function Blocks”

Introduced in R2015a

view

View Model Advisor run results for checks

Syntax

```
view(CheckResultObj)
```

Description

`view(CheckResultObj)` opens a web browser and displays the results of the check specified by `CheckResultObj`. `CheckResultObj` is a `ModelAdvisor.CheckResult` object returned by `ModelAdvisor.run`.

Input Arguments

CheckResultObj

`ModelAdvisor.CheckResult` object which is a part of a `ModelAdvisor.SystemResult` object returned by `ModelAdvisor.run`.

Examples

View the Model Advisor run results for the first check in the `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))
```

Tutorials

- “Checking Systems Programmatically”
- “Check Multiple Systems in Parallel”
- “Create a Function for Checking Multiple Systems in Parallel”

Alternatives

“View Model Advisor Report”

See Also

`ModelAdvisor.run` | `ModelAdvisor.summaryReport` | `viewReport`

Topics

“Checking Systems Programmatically”

“Check Multiple Systems in Parallel”

“Create a Function for Checking Multiple Systems in Parallel”

“Automate Model Advisor Check Execution”

“Archive and View Model Advisor Run Results”

Introduced in R2010b

viewReport

View Model Advisor run results for systems

Syntax

```
viewReport(SysResultObjArray)
viewReport(SysResultObjArray, 'MA')
viewReport(SysResultObjArray, 'Cmd')
```

Description

`viewReport(SysResultObjArray)` opens the Model Advisor Report for the system specified by `SysResultObjArray`. `SysResultObjArray` is a `ModelAdvisor.SystemResult` object returned by `ModelAdvisor.run`.

`viewReport(SysResultObjArray, 'MA')` opens the Model Advisor and displays the results of the run for the system specified by `SysResultObjArray`.

`viewReport(SysResultObjArray, 'Cmd')` displays the Model Advisor run summary in the Command Window for the systems specified by `SysResultObjArray`.

Input Arguments

SysResultObjArray

`ModelAdvisor.SystemResult` object returned by `ModelAdvisor.run`.

Default:

Examples

Open the Model Advisor report for `sldemo_auto_climatecontrol/Heater Control`.

```
% Identify Model Advisor configuration file.
% Create list of models to run.
fileName = '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_mdladv_config.mat';
SysList={'sldemo_auto_climatecontrol/Heater Control',...
        'sldemo_auto_climatecontrol/AC Control'};

% Run the Model Advisor.
SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',fileName);

% Open the Model Advisor and display results.
viewReport(SysResultObjArray{1}, 'MA')
```

Display results in the Command Window for sldemo_auto_climatecontrol/Heater Control.

```
% Identify Model Advisor configuration file.
% Create list of models to run.
fileName = 'slvndemo_mdladv_config.mat';
SysList={'sldemo_auto_climatecontrol/Heater Control',...
        'sldemo_auto_climatecontrol/AC Control'};

% Run the Model Advisor.
SysResultObjArray = ModelAdvisor.run(SysList,'Configuration',fileName);

% Display results in the Command Window.
viewReport(SysResultObjArray{1}, 'Cmd')
```

Tutorials

- “Checking Systems Programmatically”
- “Check Multiple Systems in Parallel”
- “Create a Function for Checking Multiple Systems in Parallel”

Alternatives

- “View Model Advisor Report”

- “View Results in Model Advisor GUI”
- “View Results in Command Window”

See Also

`ModelAdvisor.run` | `ModelAdvisor.summaryReport` | `view`

Topics

“Checking Systems Programmatically”

“Check Multiple Systems in Parallel”

“Create a Function for Checking Multiple Systems in Parallel”

“Automate Model Advisor Check Execution”

“Archive and View Model Advisor Run Results”

Introduced in R2010b

Visible property

Class: ModelAdvisor.Check

Package: ModelAdvisor

Indicate to display or hide check

Values

'true' (default)

'false'

Description

The `Visible` property specifies whether the Model Advisor displays the check.

| | |
|---------|-------------------|
| 'true' | Display the check |
| 'false' | Hide the check |

Examples

```
% hide all checks that do not belong to Demo group
if ~(strcmp(checkCellArray{i}.Group, 'Demo'))
    checkCellArray{i}.Visible = false;
    checkCellArray{i}.Value = false;
end
```

Visible property

Class: ModelAdvisor.Task

Package: ModelAdvisor

Indicate to display or hide task

Values

'true' (default) — Display task in the Model Advisor

'false' — Hide task

Description

The `Visible` property specifies whether the Model Advisor displays the task.

Caution: When adding checks as tasks, you cannot specify both the task and check `Visible` properties, you must specify one or the other. If you specify both properties, the Model Advisor generates an error when the check `Visible` property is `false`.

Examples

```
MAT1 = ModelAdvisor.Task('com.mathworks.sample.TaskSample1');  
MAT1.Visible = 'false';
```

slmetric.metric.registerMetric

Package: slmetric.metric

Register a custom model metric with the model metric repository

Syntax

```
[MetricID,err_msg] = slmetric.metric.registerMetric(classname)
```

Description

[MetricID,err_msg] = slmetric.metric.registerMetric(classname) register a custom model metric with the model metric repository. The new metric class must be on the MATLAB search path and derived from slmetric.metric.Metric.

Examples

Register a Custom Model Metric with the Model Metric Repository

This example shows how to register a custom model metric.

Create a new metric class, derived from slmetric.metric.Metric, called my_metric.

```
slmetric.metric.createNewMetricClass('my_metric')
```

Finish the custom model metric implementation and testing.

Register the new custom metric in the model metric repository.

```
[MetricID, err_msg] = slmetric.metric.registerMetric('my_metric');
```

Input Arguments

classname — Metric class name

character vector

New metric class name.

Data Types: char

Output Arguments

MetricID — Metric ID

character vector

Unique metric identifier.

Data Types: char

err_msg — Error message

character vector

If you cannot register a new class, the function returns an error message.

Data Types: char

See Also

See Also

`slmetric.metric.Metric` | `slmetric.metric.createNewMetricClass` |
`slmetric.metric.refresh` | `slmetric.metric.unregisterMetric`

Introduced in R2016a

slmetric.metric.unregisterMetric

Package: slmetric.metric

Unregister a custom model metric from the model metric repository

Syntax

```
slmetric.metric.unregisterMetric(MetricID)
```

Description

`slmetric.metric.unregisterMetric(MetricID)` unregister a custom model metric from the model metric repository.

Input Arguments

MetricID — Unique metric identifier

character vector

Metric identifier for a custom model metric that you created.

See Also

See Also

`slmetric.metric.Metric` | `slmetric.metric.createNewMetricClass` | `slmetric.metric.refresh` | `slmetric.metric.registerMetric`

Introduced in R2016a

slmetric.metric.refresh

Package: slmetric.metric

Update available model metrics

Syntax

```
slmetric.metric.refresh()
```

Description

`slmetric.metric.refresh()` updates available metrics after manual updates to the metric registration file.

See Also

See Also

`slmetric.metric.Metric` | `slmetric.metric.createNewMetricClass` |
`slmetric.metric.registerMetric` | `slmetric.metric.unregisterMetric`

Introduced in R2016a

slmetric.metric.createNewMetricClass

Package: slmetric.metric

Create new metric class for a custom model metric

Syntax

```
slmetric.metric.createNewMetricClass(class_name)
```

Description

`slmetric.metric.createNewMetricClass(class_name)` creates a `slmetric.metric.Metric` class in the current working folder. The new metric class is used to define a custom model metric and supports the following `Advisor.component.Types`:

- Model
- SubSystem
- ModelBlock
- Chart
- MATLABFunction

Examples

Create a Custom Model Metric Class

This example shows how to create a new metric class `my_metric`.

Call the function and provide a name for the new metric class:

```
slmetric.metric.createNewMetricClass('my_metric')
```

The function creates a `my_metric.m` file in the current working folder.

```
slmetric.metric.createNewMetricClass('my_metric')
```


The file contains the class definition for `my_metric`, which includes the constructor and an empty metric algorithm method.

```
classdef my_metric < slmetric.metric.Metric
    % my_metric Summary of this metric class goes here
    % Detailed explanation goes here
    properties
    end

    methods
        function this = my_metric()
            this.ID = 'my_metric';
            this.Description = '';
            this.ComponentScope = [Advisor.component.Types.Model, ...
                Advisor.component.Types.SubSystem];
            this.AggregationMode = slmetric.AggregationMode.Sum;
            this.AggregateComponentDetails = true;
            this.CompileContext = 'None';
            this.Version = 1;
        end

        function res = algorithm(this, component)
            res = slmetric.metric.Result();
            res.ComponentID = component.ID;
            res.MetricID = this.ID;
            res.Value = 0;
        end
    end
end
```

Write your custom metric algorithm in `algorithm`.

When your custom metric class is working and tested, register your metric using `slmetric.metric.registerMetric`.

Input Arguments

class_name — Name of the new metric class

character vector

Name of the new metric class you are creating for a custom metric.

Data Types: char

See Also

See Also

`Advisor.component.Types` | `slmetric.metric.Metric` |
`slmetric.metric.registerMetric` | `slmetric.metric.unregisterMetric`

Introduced in R2016a

exportMetrics

Class: slmetric.Engine

Package: slmetric

Export model metrics

Syntax

```
exportMetrics(metric_engine,filename)
exportMetrics(metric_engine,filename,filelocation)
```

Description

Export model metric data to an XML file.

`exportMetrics(metric_engine,filename)` exports an XML filename containing metric data to your current folder.

`exportMetrics(metric_engine,filename,filelocation)` exports an XML filename containing metric data to filelocation.

Input Arguments

metric_engine — Collects and accesses metric data

slmetric.Engine object

When you call `slmetric.Engine.execute`, `metric_engine` collects metric data for available metrics or for the specified `MetricIDs`. Calling `slmetric.Engine.getMetrics` accesses the collected metric data in `metric_engine`.

filename — XML file name

character vector

Name of XML file.

Example: `'MyMetrics.xml'`

filelocation — File path

character vector

Path to XML file

Example: 'C:/mywork'

Examples

Export Metrics to Current Folder

This example shows how to export metrics for model vdp to XML file `MyMetrics.xml` in your current folder.

```
% Create an slmetric.Engine object
metric_engine = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(metric_engine, 'Root', 'vdp', 'RootType', 'Model');

% Generate and collect model metrics
execute(metric_engine);
rc = getMetrics(metric_engine);

% Export metrics to XML file myMetrics.xml
exportMetrics(metric_engine, 'MyMetrics.xml');
```

Export Metrics to Specified Location

This example shows how to export metrics for model vdp to XML file `MyMetrics.xml` in a specified folder, `C:/work`.

```
% Create an slmetric.Engine object
metric_engine = slmetric.Engine();

% Specify model for metric analysis
setAnalysisRoot(metric_engine, 'Root', 'vdp', 'RootType', 'Model');

% Collect model metrics
execute(metric_engine);
rc = getMetrics(metric_engine);

% Export metrics to XML file myMetrics.xml
```

```
exportMetrics(metric_engine, 'MyMetrics.xml', 'C:/work');
```

See Also

See Also

`slmetric.metric.ResultCollection` | `slmetric.metric.getAvailableMetrics`

Topics

“Collect Model Metrics Programmatically”

“Model Metrics” on page 3-236

Introduced in R2016a

clonedetection

Open Identify Modeling Clones tool

Syntax

```
clonedetection(model)
```

Description

`clonedetection(model)` opens the Identifying Modeling Clones tool for a model specified by `model`. If the specified model is not open, this command opens it.

Examples

Open Identify Modeling Clones tool for a model

Open the Identify Modeling Clones tool for `rtwdemo_reusable_sys_outputs` example model:

```
clonedetection('rtwdemo_reusable_sys_outputs')
```

Input Arguments

model — Model name

character vector

Model name or handle, specified as a character vector.

Example:

Data Types: char

See Also

See Also

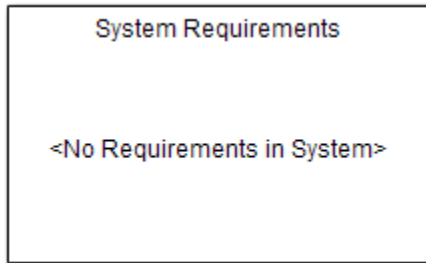
“Enable Component Reuse with Clone Detection”

Introduced in R2017a

Block Reference

System Requirements

List system requirements in Simulink models



Library

Simulink Verification and Validation

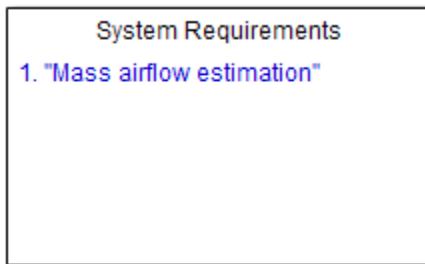
Description

The System Requirements block lists the system-level requirements associated with a model or subsystem. This block is dynamically populated. It displays system requirements associated with the level of hierarchy in which the block appears in the model. It does not list requirements associated with individual blocks in the model. To ensure that all requirement links are listed in the System Requirements block:

- 1 Right-click the background of your model.
- 2 Select **Requirements Traceability at This Level**.
- 3 From the top of the context menu, verify that all the requirements you want to list appear in the System Requirements block.

You can place this block anywhere in your model. It does not connect to other Simulink blocks. You can have only one System Requirements block in a given subsystem.

When you insert this block into your Simulink model, it is populated with the system requirements, as shown in the **Airflow Calculation** subsystem of the `slvnvdemo_fuelsys_officereq` example.



Each of the listed requirements is an active link to the requirements document. When you double-click a requirement label, the associated requirements document opens in its editor window, scrolled to the target location.

Parameters

Block Title

The title of the system requirements list in the model. The default title is System Requirements. You can enter a customized title, for example, Engine Requirements.

Introduced before R2006a

Model Advisor Checks

- “Simulink Verification and Validation Checks” on page 3-2
- “DO-178C/DO-331 Checks” on page 3-7
- “IEC 61508, IEC 62304, ISO 26262, and EN 50128 Checks” on page 3-88
- “MathWorks Automotive Advisory Board Checks” on page 3-136
- “MISRA C:2012 Checks” on page 3-218
- “Requirements Consistency Checks” on page 3-228
- “Model Metrics” on page 3-236

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 3-4

“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, IEC 62304, ISO 26262, and EN 50128 Checks” on page 3-88
- “MathWorks Automotive Advisory Board Checks” on page 3-136

For descriptions of the requirements consistency checks, see “Requirements Consistency Checks” on page 3-228.

See Also

- “Run Model Checks” (Simulink)
- “Simulink Checks” (Simulink)

- “Simulink Coder Checks” (Simulink Coder)

Modeling Standards Checks

Modeling standards checks facilitate designing and troubleshooting models from which code is generated for applications that must meet safety or mission-critical requirements or MathWorks® Automotive Advisory Board (MAAB) modeling guidelines.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the modeling standards checks.

For descriptions of the modeling standards checks, see

- “DO-178C/DO-331 Checks” on page 3-7
- “IEC 61508, IEC 62304, ISO 26262, and EN 50128 Checks” on page 3-88
- “MathWorks Automotive Advisory Board Checks” on page 3-136

See Also

- “Run Model Checks” (Simulink)
- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)

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)
- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)
- “MAAB Control Algorithm Modeling” (Simulink) 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)
- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)
- “MAAB Control Algorithm Modeling” (Simulink) 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)
- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)
- “MAAB Control Algorithm Modeling” (Simulink) 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)

- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)
- “MAAB Control Algorithm Modeling” (Simulink) 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)
- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)
- “MAAB Control Algorithm Modeling” (Simulink) 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)
- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)
- “MAAB Control Algorithm Modeling” (Simulink) 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)
- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)
- “MAAB Control Algorithm Modeling” (Simulink) guidelines

DO-178C/DO-331 Checks

In this section...

- “DO-178C/DO-331 Checks” on page 3-8
- “Check model object names” on page 3-9
- “Check safety-related optimization settings” on page 3-12
- “Check safety-related diagnostic settings for solvers” on page 3-16
- “Check safety-related diagnostic settings for sample time” on page 3-19
- “Check safety-related diagnostic settings for signal data” on page 3-21
- “Check safety-related diagnostic settings for parameters” on page 3-24
- “Check safety-related diagnostic settings for data used for debugging” on page 3-27
- “Check safety-related diagnostic settings for data store memory” on page 3-29
- “Check safety-related diagnostic settings for type conversions” on page 3-31
- “Check safety-related diagnostic settings for signal connectivity” on page 3-33
- “Check safety-related diagnostic settings for bus connectivity” on page 3-35
- “Check safety-related diagnostic settings that apply to function-call connectivity” on page 3-37
- “Check safety-related diagnostic settings for compatibility” on page 3-39
- “Check safety-related diagnostic settings for model initialization” on page 3-40
- “Check safety-related diagnostic settings for model referencing” on page 3-43
- “Check safety-related model referencing settings” on page 3-46
- “Check safety-related code generation settings” on page 3-48
- “Check safety-related diagnostic settings for saving” on page 3-54
- “Check for blocks that do not link to requirements” on page 3-56
- “Check state machine type of Stateflow charts” on page 3-57
- “Check Stateflow charts for ordering of states and transitions” on page 3-59
- “Check Stateflow debugging options” on page 3-61
- “Check usage of lookup table blocks” on page 3-63
- “Check MATLAB Code Analyzer messages” on page 3-65
- “Check MATLAB code for global variables” on page 3-67

In this section...

“Check for inconsistent vector indexing methods” on page 3-69

“Check for MATLAB Function interfaces with inherited properties” on page 3-70

“Check MATLAB Function metrics” on page 3-72

“Check for blocks not recommended for C/C++ production code deployment” on page 3-74

“Check for variant blocks with 'Generate preprocessor conditionals' active” on page 3-75

“Check Stateflow charts for uniquely defined data objects” on page 3-76

“Check usage of Math Operations blocks” on page 3-77

“Check usage of Signal Routing blocks” on page 3-80

“Check usage of Logic and Bit Operations blocks” on page 3-81

“Check usage of Ports and Subsystems blocks” on page 3-83

“Display model version information” on page 3-87

DO-178C/DO-331 Checks

DO-178C/DO-331 checks facilitate designing and troubleshooting models from which code is generated for applications that must meet safety or mission-critical requirements.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the DO-178C/DO-331 checks.

See Also

- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

Check model object names

Check ID: mathworks.do178.hisl_0032

Check model object names.

Description

This check verifies that the following model object names comply with your own modeling guidelines or the high-integrity modeling guidelines. The check also verifies that the model object does not use a reserved name.

- Blocks
- Signals
- Parameters
- Busses
- Stateflow objects

Reserved names:

- MATLAB keywords
- Reserved keywords for C, C++, and code generation. For complete list, see “Reserved Keywords” (Simulink Coder)
- `int8`, `uint8`
- `int16`, `uint16`
- `int32`, `uint32`
- `inf`, `Inf`
- `NaN`, `nan`
- `eps`
- `intmin`, `intmax`
- `realmin`, `realmax`
- `pi`
- `infinity`
- `Nil`

Note: For some cases, the Model Advisor reports an issue in multiple subchecks of this check.

Available with Simulink Verification and Validation.

Input Parameters

To specify the naming standard and model object names that the check flags, use the Model Advisor Configuration Editor.

- 1 Open the Model Configuration Editor and navigate to **Check model object names**. In the **Input Parameters** pane, for each of the model objects, select one of the following:
 - **MAAB** to use the MAAB naming standard. When you select MAAB, the check uses the regular expression $(^{\{32,\}}$) | ([^a-zA-Z_0-9]) | (^d) | (^) | (__) | (^_) | (_$)$ to verify that names:
 - Use these characters: a-z, A-Z, 0-9, and the underscore (_).
 - Do not start with a number.
 - Do not use underscores at the beginning or end of a string.
 - Do not use more than one consecutive underscore.
 - Use strings that are less than 32 characters.
 - **Custom** to use your own naming standard. When you select Custom, you can enter your own **Regular expression for prohibited <model object> names**. For example, if you want to allow more than one consecutive underscore, enter $(^{\{32,\}}$) | ([^a-zA-Z_0-9]) | (^d) | (^) | (^_) | (_$)$
 - **None** if you do not want the check to verify the model object name
- 2 Click **Apply**.
- 3 Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model object names do not comply with the naming standard specified in the input parameters. | Update the model object names to comply with your own guidelines or the high-integrity guidelines. |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- “hisl_0032: Model object names” (Simulink)
- MAAB guideline, Version 3.0: jc_0201: Usable characters for Subsystem names (Simulink)
- MAAB guideline, Version 3.0: jc_0211: Usable characters for Inport blocks and Outport blocks (Simulink)
- MAAB guideline, Version 3.0: jc_0221: Usable characters for signal line names (Simulink)
- MAAB guideline, Version 3.0: jc_0231: Usable characters for block names (Simulink)
- MAAB guideline, Version 3.0: na_0030: Usable characters for Simulink Bus names (Simulink)

Check safety-related optimization settings

Check ID: `mathworks.do178.OptionSet`

Check model configuration for optimization settings that can impact safety.

Description

This check verifies that model optimization configuration parameters are set optimally for generating code for a safety-related application. Although highly optimized code is desirable for most real-time systems, some optimizations can have undesirable side effects that impact safety.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Block reduction optimization is selected. This optimization can remove blocks from generated code, resulting in requirements without associated code and violations for traceability requirements. (See DO-331, Section MB.6.3.4.e—Source code is traceable to low-level requirements.) | Clear the Block reduction (Simulink) parameter on the All Parameters tab of the Configuration Parameters dialog box or set the parameter <code>BlockReduction</code> to <code>off</code> . |
| Implementation of logic signals as Boolean data is cleared. Strong data typing is recommended for safety-related code. (See DO-331, Section MB.6.3.1.e—High-level requirements conform to standards, DO-331, Section MB.6.3.2.e—Low-level requirements conform to standards, and MISRA C:2012, Rule 10.1.) | Select Implement logic signals as boolean data (vs. double) (Simulink) on the All Parameters tab in the Configuration Parameters dialog box or set the parameter <code>BooleanDataType</code> to <code>on</code> . |
| The model includes blocks that depend on elapsed or absolute time and is configured to minimize the amount of memory allocated for the timers. Such a configuration limits the number of days the application can execute before a timer overflow occurs. Many aerospace products are powered on | Set Application lifespan (days) (Simulink) on the Optimization pane in the Configuration Parameters dialog box or set the parameter <code>LifeSpan</code> to <code>inf</code> . |

| Condition | Recommended Action |
|--|---|
| <p>continuously and timers should not assume a limited lifespan. (See DO-331, Section MB.6.3.1.g—Algorithms are accurate and DO-331, Section MB.6.3.2.g—Algorithms are accurate.)</p> | |
| <p>The optimization that suppresses the generation of initialization code for root-level inports and outports that are set to zero is selected. For safety-related code, you should explicitly initialize all variables. (See DO-331, Section MB.6.3.3.b—Software architecture is consistent.)</p> | <p>If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the Remove root level I/O zero initialization (Simulink) check box on the Optimization pane in 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.)</p> | <p>If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the Remove internal data zero initialization (Simulink) check box on the Optimization pane in 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 and DO-331, Section MB.6.3.2.g—Algorithms are accurate.)</p> | <p>If you have a Simulink Coder™ license, select Remove code from floating-point to integer conversions that wraps out-of-range values (Simulink) on the Optimization pane in the Configuration Parameters dialog box or set the parameter <code>EfficientFloat2IntCast</code> to on.</p> |

| Condition | Recommended Action |
|---|---|
| <p>The optimization that suppresses generation of code that guards against division by zero for fixed-point data is selected. You must avoid division-by-zero exceptions in safety-related code. (See DO-331, Section MB.6.3.1.g—Algorithms are accurate, DO-331, Section MB.6.3.2.g—Algorithms are accurate, and MISRA C:2012, Dir 4.1.)</p> | <p>If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the Remove code that protects against division arithmetic exceptions (Simulink) check box on the Optimization pane in the Configuration Parameters dialog box or set the parameter <code>NoFixptDivByZeroProtection</code> to off.</p> |
| <p>The optimization that uses the specified minimum and maximum values for signals and parameters to optimize the generated code is selected. This might result in requirements without traceable code. (See DO-331 Section MB.6.3.4.e - Source code is traceable to low-level requirements.)</p> | <p>If you have an Embedded Coder license, and you are using an ERT-based system target file, clear the Optimize using the specified minimum and maximum values (Simulink) check box on the Optimization pane in the Configuration Parameters dialog box.</p> |

Action Results

Clicking **Modify Settings** configures model optimization settings that can impact safety.

Subchecks depend on the results of the subchecks noted with **D** in the results table in the Model Advisor window.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Optimization Pane: General” (Simulink)
- “Optimize Generated Code Using Minimum and Maximum Values” (Embedded Coder)
- 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” (Simulink)
- “hisl_0045: Configuration Parameters > Optimization > Implement logic signals as Boolean data (vs. double)” (Simulink)

- “hisl_0046: Configuration Parameters > Optimization > Block reduction” (Simulink)
- “hisl_0048: Configuration Parameters > Optimization > Application lifespan (days)” (Simulink)
- “hisl_0052: Configuration Parameters > Optimization > Data initialization” (Simulink)
- “hisl_0053: Configuration Parameters > Optimization > Remove code from floating-point to integer conversions that wraps out-of-range values” (Simulink)
- “hisl_0054: Configuration Parameters > Optimization > Remove code that protects against division arithmetic exceptions” (Simulink)

Check safety-related diagnostic settings for solvers

Check ID: `mathworks.do178.SolverDiagnosticsSet`

Check model configuration for diagnostic settings that apply to solvers and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to solvers are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <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 (Simulink) on the Diagnostics > Solver pane in the Configuration Parameters dialog box or set the parameter AlgebraicLoopMsg to error. Consider breaking such loops explicitly with Unit Delay blocks so that the execution order is predictable. At a minimum, verify that the results of loops breaking automatically are acceptable.</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 (Simulink) on the Diagnostics > Solver pane in the Configuration Parameters dialog box or set the parameter ArtificialAlgebraicLoopMsg to error. Consider breaking such loops explicitly with Unit Delay blocks so that the execution order is predictable. At a minimum, verify that the results of loops breaking automatically are acceptable.</p> |
| <p>The diagnostic for detecting potential conflict in block execution order is set to none or warning. For safety-related applications,</p> | <p>Set Block priority violation (Simulink) on the Diagnostics > Solver pane in the Configuration Parameters dialog box or set the parameter BlockPriorityViolationMsg to error.</p> |

| Condition | Recommended Action |
|--|---|
| <p>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>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 time (Simulink) on the All Parameters pane in the Configuration Parameters dialog box or set the parameter <code>UnknownTsInhSupMsg</code> 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 (Simulink) on the Diagnostics > Solver pane in the Configuration Parameters dialog box or set the parameter <code>SolverPrmCheckMsg</code> 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 (Simulink) on the Diagnostics > Solver pane in the Configuration Parameters dialog box or set the parameter <code>StateNameClashWarn</code> to warning.</p> |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to solvers and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Model Configuration Parameters: Diagnostics” (Simulink)
- “View Diagnostics” (Simulink)
- 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” (Simulink)

Check safety-related diagnostic settings for sample time

Check ID: `mathworks.do178.SampleTimeDiagnosticsSet`

Check model configuration for diagnostic settings that apply to sample time and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to sample times are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| The diagnostic for detecting when a source block, such as a Sine Wave block, inherits a sample time (specified as -1) is set to none or warning . The use of inherited sample times for a source block can result in unpredictable execution rates for the source block and blocks connected to it. For safety-related applications, source blocks should have explicit sample times to prevent incorrect execution sequencing. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.) | Set Source block specifies -1 sample time (Simulink) on the Diagnostics > Sample Time pane in the Configuration Parameters dialog box or set the parameter <code>InheritedTsInSrcMsg</code> to error . |
| The diagnostic for detecting invalid rate transitions between two blocks operating in multitasking mode is set to none or warning . Such rate transitions should not be used for embedded real-time code. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.) | Set Multitask rate transition (Simulink) on the Diagnostics > Sample Time pane in the Configuration Parameters dialog box or set the parameter <code>MultiTaskRateTransMsg</code> to error . |
| The diagnostic for detecting subsystems that can cause data corruption or nondeterministic behavior is set to none or warning . This diagnostic detects | Set Multitask conditionally executed subsystem (Simulink) on the Diagnostics > Sample Time pane in the Configuration |

| Condition | Recommended Action |
|---|---|
| whether conditionally executed multirate subsystems (enabled, triggered, or function-call subsystems) operate in multitasking mode. Such subsystems can corrupt data and behave unpredictably in real-time environments that allow preemption. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.) | Parameters dialog box or set the parameter <code>MultiTaskCondExecSysMsg</code> to <code>error</code> . |
| The diagnostic for checking sample time consistency between a Signal Specification block and the connected destination block is set to <code>none</code> or <code>warning</code> . An over-specified sample time can result in an unpredictable execution rate. (See DO-331, Section MB.6.3.3.e – Software architecture conforms to standards.) | Set Enforce sample times specified by Signal Specification blocks (Simulink) on the Diagnostics > Sample Time pane in the Configuration Parameters dialog box or set the parameter <code>SigSpecEnsureSampleTimeMsg</code> to <code>error</code> . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to sample time and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Model Configuration Parameters: Sample Time Diagnostics” (Simulink)
- “View Diagnostics” (Simulink)
- 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” (Simulink)

Check safety-related diagnostic settings for signal data

Check ID: `mathworks.do178.DataValiditySignalsDiagnosticsSet`

Check model configuration for diagnostic settings that apply to signal data and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to signal data are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>The diagnostic that specifies how the Simulink software resolves signals associated with <code>Simulink.Signal</code> objects is set to <code>Explicit and implicit</code> or <code>Explicit and warn implicit</code>. For safety-related applications, model developers should be required to define signal resolution explicitly. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set Signal resolution (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>SignalResolutionControl</code> to <code>Explicit only</code>. This provides predictable operation by requiring users to define each signal and block setting that must resolve to <code>Simulink.Signal</code> objects in the workspace.</p> <p>Alternatively, to disable the use of <code>Simulink.Signal</code> objects, set the configuration parameter to <code>None</code>.</p> |
| <p>The Product block diagnostic that detects a singular matrix while inverting one of its inputs in matrix multiplication mode is set to <code>none</code> or <code>warning</code>. Division by a singular matrix can result in numeric exceptions when executing generated code. This is not acceptable in safety-related systems. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA C:2012, Dir 4.1.)</p> | <p>Set Division by singular matrix (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>CheckMatrixSingularityMsg</code> to <code>error</code>.</p> |

| Condition | Recommended Action |
|--|--|
| <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 (Simulink) on the Diagnostics > Data Validity pane in 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:2012, Dir 4.1.)</p> | <p>Set Wrap on overflow (Simulink) on the Diagnostics > Data Validity pane in 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:2012, Dir 4.1.)</p> | <p>Set Saturate on overflow (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>IntegerSaturationMsg</code> to error.</p> |
| <p>The diagnostic that detects when the value of a block output signal is Inf or NaN at the current time step is set to none or warning. When this type of block output signal condition occurs, numeric exceptions can result, and numeric exceptions are not acceptable in safety-related applications. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA C:2012, Dir 4.1.)</p> | <p>Set Inf or NaN block output (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>SignalInfNanChecking</code> to error.</p> |

| Condition | Recommended Action |
|---|--|
| <p>The diagnostic that detects Simulink object names that begin with <code>rt</code> is set to <code>none</code> or <code>warning</code>. This diagnostic prevents name clashes with generated signal names that have an <code>rt</code> prefix. (See DO-331, Section MB.6.3.1.e – High-level requirements conform to standards, and DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards.)</p> | <p>Set "rt" prefix for identifiers (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>RTPrefix</code> to <code>error</code>.</p> |
| <p>The diagnostic that detects simulation range checking is set to <code>none</code> or <code>warning</code>. This diagnostic detects when signals exceed their specified ranges during simulation. Simulink compares the signal values that a block outputs with the specified range and the block data type. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate, DO-331, Section MB.6.3.2.g – Algorithms are accurate, and MISRA C:2012, Dir 4.1.)</p> | <p>Set Simulation range checking (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>SignalRangeChecking</code> to <code>error</code>.</p> |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to signal data and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Model Configuration Parameters: Data Validity Diagnostics” (Simulink)
- “View Diagnostics” (Simulink)
- 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” (Simulink)

Check safety-related diagnostic settings for parameters

Check ID: `mathworks.do178.DataValidityParamDiagnosticsSet`

Check model configuration for diagnostic settings that apply to parameters and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to parameters are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| <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 and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)</p> | <p>Set Detect downcast (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>ParameterDowncastMsg</code> to error.</p> |
| <p>The diagnostic that detects when a parameter underflow occurs is set to none or warning. When the data type of a parameter does not have enough resolution, the parameter value is zero instead of the specified value. This can lead to incorrect operation of generated code. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.)</p> | <p>Set Detect underflow (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>ParameterUnderflowMsg</code> to error.</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</p> | <p>Set Detect overflow (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>ParameterOverflowMsg</code> to error.</p> |

| Condition | Recommended Action |
|--|---|
| accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.) | |
| The diagnostic that detects when a parameter loses precision is set to none or warning . Not detecting such errors can result in a parameter being set to an incorrect value in the generated code. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.) | Set Detect precision loss (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>ParameterPrecisionLossMsg</code> to error . |
| The diagnostic that detects when an expression with tunable variables is reduced to its numerical equivalent is set to none or warning . This can result in a tunable parameter unexpectedly not being tunable in generated code. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.) | Set Detect loss of tunability (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>ParameterTunabilityLossMsg</code> to error . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to parameters and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Model Configuration Parameters: Data Validity Diagnostics” (Simulink)
- “View Diagnostics” (Simulink)
- 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”
(Simulink)

Check safety-related diagnostic settings for data used for debugging

Check ID: `mathworks.do178.DataValidityDebugDiagnosticsSet`

Check model configuration for diagnostic settings that apply to data used for debugging and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to debugging are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The diagnostic that enables model verification blocks is set to Use local settings or Enable all . Such blocks should be disabled because they are assertion blocks, which are for verification only. Model developers should not use assertions in embedded code. | In the Configuration Parameters dialog box, on the All Parameters tab, set Model Verification block enabling (Simulink) or set the parameter AssertControl to Disable All . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to data used for debugging and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.1.e – High-level requirements conform to standards
- DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards
- “Model Configuration Parameters: Data Validity Diagnostics” (Simulink)

- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0305: Configuration Parameters > Diagnostics > Debugging” (Simulink)

Check safety-related diagnostic settings for data store memory

Check ID: mathworks.do178.DataStoreMemoryDiagnosticsSet

Check model configuration for diagnostic settings that apply to data store memory and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to data store memory are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The diagnostic that detects whether the model attempts to read data from a data store in which it has not stored data in the current time step is set to a value other than Enable all as errors . Reading data before it is written can result in use of stale data or data that is not initialized. | Set Detect read before write (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>ReadBeforeWriteMsg</code> 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 (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>WriteAfterReadMsg</code> to Enable all as errors . |
| The diagnostic that detects whether the model attempts to store data in a data store twice in succession in the current time step is set to a value other than Enable all as errors . Writing data twice in one time step can result in unpredictable data. | Set Detect write after write (Simulink) on the Diagnostics > Data Validity pane in the Configuration Parameters dialog box or set the parameter <code>WriteAfterWriteMsg</code> to Enable all as errors . |
| The diagnostic that detects when one task reads data from a Data Store Memory block | Set Multitask data store (Simulink) on the Diagnostics > Data Validity pane in the |

| Condition | Recommended Action |
|---|---|
| to which another task writes data is set to none or warning . Reading or writing data in different tasks in multitask mode can result in corrupted or unpredictable data. | Configuration Parameters dialog box or set the parameter <code>MultiTaskDSMMsg</code> to error . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to data store memory and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “Model Configuration Parameters: Data Validity Diagnostics” (Simulink)
- 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” (Simulink)

Check safety-related diagnostic settings for type conversions

Check ID: mathworks.do178.TypeConversionDiagnosticsSet

Check model configuration for diagnostic settings that apply to type conversions and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to type conversions are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <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 (Simulink) on the Diagnostics > Type Conversion pane in 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 (Simulink) on the Diagnostics > Type Conversion pane in the Configuration Parameters dialog box or set the parameter <code>VectorMatrixConversionMsg</code> to error.</p> |

| Condition | Recommended Action |
|---|--|
| The diagnostic that detects when a 32-bit integer value is converted to a floating-point value is set to none . This type of conversion can result in a loss of precision due to truncation of the least significant bits for large integer values. (See DO-331, Section MB.6.3.1.g – Algorithms are accurate and DO-331, Section MB.6.3.2.g – Algorithms are accurate.) | Set 32-bit integer to single precision float conversion (Simulink) on the Diagnostics > Type Conversion pane in the Configuration Parameters dialog box or set the parameter Int32ToFloatConvMsg to warning . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to type conversions and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Model Configuration Parameters: Type Conversion Diagnostics” (Simulink)
- 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” (Simulink)

Check safety-related diagnostic settings for signal connectivity

Check ID: mathworks.do178.ConnectivitySignalsDiagnosticsSet

Check model configuration for diagnostic settings that apply to signal connectivity and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to signal connectivity are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The diagnostic that detects virtual signals that have a common source signal but different labels is set to none or warning . This diagnostic pertains to virtual signals only and has no effect on generated code. However, signal label mismatches can lead to confusion during model reviews. | Set Signal label mismatch (Simulink) on the Diagnostics > Connectivity pane in 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 (Simulink) on the Diagnostics > Connectivity pane in the Configuration Parameters dialog box or set the parameter <code>UnconnectedInputMsg</code> to error. |
| The diagnostic that detects when the model contains a block with an unconnected output signal is set to none or warning . This must be detected because dead code can result from unconnected block output signals. | Set Unconnected block output ports (Simulink) on the Diagnostics > Connectivity pane in 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 (Simulink) on the Diagnostics > Connectivity pane in 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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.1.e – High-level requirements conform to standards
- DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards
- “Model Configuration Parameters: Connectivity Diagnostics” (Simulink)
- “Signal Basics” (Simulink)
- 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” (Simulink)

Check safety-related diagnostic settings for bus connectivity

Check ID: `mathworks.do178.ConnectivityBussesDiagnosticsSet`

Check model configuration for diagnostic settings that apply to bus connectivity and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to bus connectivity are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The diagnostic that detects whether a Model block's root Output block is connected to a bus but does not specify a bus object is set to none or warning . For a bus signal to cross a model boundary, the signal must be defined as a bus object for compatibility with higher level models that use a model as a reference model. | Set Unspecified bus object at root Output block (Simulink) on the Diagnostics > Connectivity pane in the Configuration Parameters dialog box or set the parameter <code>RootOutputRequireBusObject</code> to error. |
| The diagnostic that detects whether the name of a bus element matches the name specified by the corresponding bus object is set to none or warning . This diagnostic prevents the use of incompatible buses in a bus-capable block such that the output names are inconsistent. | Set Element name mismatch (Simulink) on the Diagnostics > Connectivity pane in the Configuration Parameters dialog box or set the parameter <code>BusObjectLabelMismatch</code> to error. |
| The diagnostic that detects when some blocks treat a signal as a mux/vector, while other blocks treat the signal as a bus, is set to none or warning . When the Simulink software automatically converts a muxed signal to a bus, it is possible for an unintended operation or unpredictable behavior to occur. | Set Bus signal treated as vector (Simulink) on the Diagnostics > Connectivity pane in the Configuration Parameters dialog box to error, or the parameter <code>StrictBusMsg</code> to <code>ErrorOnBusTreatedAsVector</code> . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to bus connectivity and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “Model Configuration Parameters: Connectivity Diagnostics” (Simulink)
- 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” (Simulink)

Check safety-related diagnostic settings that apply to function-call connectivity

Check ID: `mathworks.do178.FcnCallDiagnosticsSet`

Check model configuration for diagnostic settings that apply to function-call connectivity and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to function-call connectivity are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The diagnostic that detects incorrect use of a function-call subsystem is set to none or warning . If this condition is undetected, incorrect code might be generated. | Set Invalid function-call connection (Simulink) on the Diagnostics > Connectivity pane in the Configuration Parameters dialog box or set the parameter <code>InvalidFcnCallConMsg</code> to error . |
| The diagnostic that specifies whether the Simulink software has to compute inputs of a function-call subsystem directly or indirectly while executing the subsystem is set to Use local settings or Disable all . This diagnostic detects unpredictable data coupling between a function-call subsystem and the inputs of the subsystem in the generated code. | Set Context-dependent inputs (Simulink) on the Diagnostics > Connectivity pane in the Configuration Parameters dialog box or set the parameter <code>FcnCallInpInsideContextMsg</code> to Enable all as errors . |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to function-call connectivity and that can impact safety.

Capabilities and Limitations

- Does not run on library models.

- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “Model Configuration Parameters: Connectivity Diagnostics” (Simulink)
- 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” (Simulink)

Check safety-related diagnostic settings for compatibility

Check ID: mathworks.do178.CompatibilityDiagnosticsSet

Check model configuration for diagnostic settings that affect compatibility and that might impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to compatibility are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| The diagnostic that detects when a block has not been upgraded to use features of the current release is set to none or warning . An S-function written for an earlier version might not be compatible with the current version and generated code could operate incorrectly. | Set S-function upgrades needed (Simulink) on the Diagnostics > Compatibility pane in 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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- “View Diagnostics” (Simulink)
- “Model Configuration Parameters: Compatibility Diagnostics” (Simulink)

- 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” (Simulink)

Check safety-related diagnostic settings for model initialization

Check ID: `mathworks.do178.InitDiagnosticsSet`

In the model configuration, check diagnostic settings that affect model initialization and might impact safety.

Description

This check verifies that model diagnostic configuration parameters for initialization are optimally set to generate code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| In the Configuration Parameters dialog box, on the All Parameters tab, the “Underspecified initialization detection” (Simulink) diagnostic is set to Classic , ensuring compatibility with previous releases of Simulink. The “Check undefined subsystem initial output” (Simulink) diagnostic is cleared. This diagnostic specifies whether Simulink displays a warning if the model contains a conditionally executed subsystem, in which a block with a specified initial condition drives an Output block with an undefined initial condition. A conditionally executed subsystem could have an output that is not initialized. If undetected, this condition can produce behavior that is nondeterministic. | Do one of the following: <ul style="list-style-type: none"> • In the Configuration Parameters dialog box, on the All Parameters tab, set Underspecified initialization detection (Simulink) to Simplified. • In the Configuration Parameters dialog box, on the All Parameters tab, set Underspecified initialization detection (Simulink) to Classic and select Check undefined subsystem initial output (Simulink). • Set the parameter <code>CheckSSInitialOutputMsg</code> to on. |
| In the Configuration Parameters dialog box, on the All Parameters tab, the “Underspecified | Do one of the following: |

| Condition | Recommended Action |
|---|---|
| <p>initialization detection” (Simulink) diagnostic is set to Classic, ensuring compatibility with previous releases of Simulink. This diagnostic detects potential initial output differences from earlier releases. A conditionally executed subsystem could have an output that is not initialized. If undetected, this condition can produce behavior that is nondeterministic.</p> | <ul style="list-style-type: none"> • In the Configuration Parameters dialog box, on the All Parameters tab, set Underspecified initialization detection (Simulink) to Simplified. • In the Configuration Parameters dialog box, on the All Parameters tab, set Underspecified initialization detection (Simulink) to Classic. • Set the parameter <code>CheckExecutionContextPreStartOutputMsg</code> to on. |
| <p>In the Configuration Parameters dialog box, on the All Parameters tab, the “Underspecified initialization detection” (Simulink) diagnostic is set to Classic, ensuring compatibility with previous releases of Simulink. The “Check runtime output of execution context” (Simulink) 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 All Parameters tab, set Underspecified initialization detection (Simulink) to Simplified. • In the Configuration Parameters dialog box, on the All Parameters tab, set Underspecified initialization detection (Simulink) to Classic and select Check runtime output of execution context (Simulink). • 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.

Capabilities and Limitations

- Does not run on library models.

- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b – Software architecture is consistent
- MISRA C:2012, Rule 9.1
- “View Diagnostics” (Simulink)
- “Model Configuration Parameters: Data Validity Diagnostics” (Simulink)
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards
- “hisl_0304: Configuration Parameters > Diagnostics > Model initialization” (Simulink)

Check safety-related diagnostic settings for model referencing

Check ID: mathworks.do178.MdlrefDiagnosticsSet

Check model configuration for diagnostic settings that apply to model referencing and that can impact safety.

Description

This check verifies that model diagnostic configuration parameters pertaining to model referencing are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <p>The diagnostic that detects a mismatch between the version of the model that creates or refreshes a Model block and the current version of the referenced model is set to error or warning. The detection occurs during load and update operations. When you get the latest version of the referenced model from the software configuration management system, rather than an older version that was used in a previous simulation, if this diagnostic is set to error, the simulation is aborted. If the diagnostic is set to warning, a warning message is issued. To resolve the issue, the user must resave the model being simulated, which may not be the desired action. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.)</p> | <p>Set Model block version mismatch (Simulink) on the Diagnostics > Model Referencing pane in the Configuration Parameters dialog box or set the parameter <code>ModelReferenceVersionMismatchMessage</code> to none.</p> |
| <p>The diagnostic that detects port and parameter mismatches during model loading and updating is set to none or warning. If undetected, such mismatches can lead to incorrect simulation results because the parent and referenced models have different</p> | <p>Set Port and parameter mismatch (Simulink) on the Diagnostics > Model Referencing pane in the Configuration Parameters dialog box or set the parameter <code>ModelReferenceIOMismatchMessage</code> to error.</p> |

| Condition | Recommended Action |
|--|--|
| interfaces. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.) | |
| The diagnostic that detects invalid internal connections to the current model's root-level Inport and Outport blocks is set to none or warning . When this condition is detected, the Simulink software might automatically insert hidden blocks into the model to fix the condition. The hidden blocks can result in generated code without traceable requirements. Setting the diagnostic to error forces model developers to fix the referenced models manually. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.) | Set Invalid root Inport/Outport block connection (Simulink) on the Diagnostics > Model Referencing pane in the Configuration Parameters dialog box or set the parameter <code>ModelReferenceIOMessage</code> to error . |
| The diagnostic that detects whether To Workspace or Scope blocks are logging data in a referenced model is set to none or warning . Data logging is not supported for To Workspace and Scope blocks in referenced models. (See DO-331, Section MB.6.3.1.d – High-level requirements are verifiable and DO-331, Section MB.6.3.2.d – Low-level requirements are verifiable.) | Set Unsupported data logging (Simulink) on the Diagnostics > Model Referencing pane in 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” (Simulink). |

Action Results

Clicking **Modify Settings** configures model diagnostic settings that apply to model referencing and that can impact safety.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “View Diagnostics” (Simulink)

- “Model Configuration Parameters: Model Referencing Diagnostics” (Simulink)
- 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” (Simulink)
- “hisl_0310: Configuration Parameters > Diagnostics > Model Referencing” (Simulink)

Check safety-related model referencing settings

Check ID: mathworks.do178.MdlrefOptSet

Check model configuration for model referencing settings that can impact safety.

Description

This check verifies that model configuration parameters for model referencing are set optimally for generating code for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <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 (Simulink) on the Model Referencing pane in 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,</p> | <p>Set Never rebuild diagnostic (Simulink) on the Model Referencing pane in the Configuration Parameters dialog box or set the parameter <code>CheckModelReferenceTargetMessage</code> to <code>error</code>.</p> |

| Condition | Recommended Action |
|--|--|
| Section MB.6.3.2.b – Low-level requirements are accurate and consistent.) | |
| The ability to pass scalar root input by value is off. This capability should be off because scalar values can change during a time step and result in unpredictable data. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.) | Set Pass fixed-size scalar root inputs by value for Real-Time Workshop (Simulink) on the Model Referencing pane in the Configuration Parameters dialog box or set the parameter <code>ModelReferencePassRootInputsByReference</code> to off. |
| The model is configured to minimize algebraic loop occurrences. This configuration is incompatible with the recommended setting of Single output/update function for embedded systems code. (See DO-331, Section MB.6.3.3.b – Software architecture is consistent.) | In the Configuration Parameters dialog box, on the All Parameters tab, set Minimize algebraic loop occurrences (Simulink) or set the parameter <code>ModelReferenceMinAlgLoopOccurrences</code> to off. |

Action Results

Clicking **Modify Settings** configures model referencing settings that can impact safety.

Subchecks depend on the results of the subchecks noted with **D** in the results table in the Model Advisor window.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “hisl_0037: Configuration Parameters > Model Referencing” (Simulink)
- “Analyze Model Dependencies” (Simulink)
- “Model Configuration Parameters: Model Referencing” (Simulink)
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

Check safety-related code generation settings

Check ID: `mathworks.do178.CodeSet`

Check model configuration for code generation settings that can impact safety.

Description

This check verifies that model configuration parameters for code generation are set optimally for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The option to include comments in the generated code is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.) | Select Include comments (Simulink Coder) on the Code Generation > Comments pane in 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 (Simulink Coder) on the Code Generation > Comments pane in 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 (Simulink Coder) on the Code Generation > Comments pane in 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 | Select Verbose comments for SimulinkGlobal storage class (Simulink Coder) on the Code Generation > Comments pane in the Configuration Parameters dialog box or set the parameter <code>ForceParamTrailComments</code> to on. |

| Condition | Recommended Action |
|--|--|
| – Source code is traceable to low-level requirements.) | |
| The option to include requirement descriptions assigned to Simulink blocks as comments is cleared. Comments provide good traceability between the code and the model. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.) | Select Requirements in block comments (Simulink Coder) on the Code Generation > Custom comments pane in 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 embedded systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.) | Clear Support: non-finite numbers (Simulink Coder) on the Code Generation > Interface pane in the Configuration Parameters dialog box or set the parameter <code>SupportNonFinite</code> to off. |
| The option to generate and maintain integer counters for absolute and elapsed time is selected. Support for absolute time is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.) | Clear Support: absolute time (Simulink Coder) on the Code Generation > Interface pane in the Configuration Parameters dialog box or set the parameter <code>SupportAbsoluteTime</code> to off. |
| The option to generate code for blocks that use continuous time is selected. Support for continuous time is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.) | Clear Support: continuous time (Simulink Coder) on the Code Generation > Interface pane in the Configuration Parameters dialog box or set the parameter <code>SupportContinuousTime</code> to off. |

| Condition | Recommended Action |
|---|--|
| <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 (Simulink Coder) on the All Parameters tab in the Configuration Parameters dialog box or set the parameter <code>SupportNonInlinedSFcns</code> to off.</p> |
| <p>The option to generate model function calls compatible with the main program module of the pre-R2012a GRT target is selected. This option is inappropriate for real-time safety-related systems. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer and DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer.)</p> | <p>Clear Classic call interface (Simulink Coder) on the Code Generation > All Parameters pane in 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 (Simulink Coder) on the All Parameters tab in 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 (Simulink Coder) on the All Parameters tab in the Configuration Parameters dialog box or set the parameter <code>IncludeMdlTerminateFcn</code> to off.</p> |

| Condition | Recommended Action |
|--|--|
| <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 Remove error status field in real-time model data structure (Simulink Coder) on the Code Generation > Interface pane in the Configuration Parameters dialog box or set the parameter <code>SuppressErrorStatus</code> to on.</p> |
| <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 (Simulink Coder) on the All Parameters tab in the Configuration Parameters dialog box or set the parameter <code>MatFileLogging</code> to off.</p> |
| <p>The option that specifies the style for parenthesis usage is set to Minimum (Rely on C/C++ operators precedence) or to Nominal (Optimize for readability). For safety-related applications, explicitly specify precedence with parentheses. (See DO-331, Section MB.6.3.1.c – High-level requirements are compatible with target computer, DO-331, Section MB.6.3.2.c – Low-level requirements are compatible with target computer, and MISRA C:2012, Rule 12.1.)</p> | <p>Set Parentheses level (Embedded Coder) on the Code Generation > Code Style pane in 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 (Embedded Coder) on the Code Generation > Code Style pane in the Configuration Parameters dialog box or set the parameter <code>PreserveExpressionOrder</code> to on.</p> |

| Condition | Recommended Action |
|--|--|
| <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 (Embedded Coder) on the Code Generation > Code Style pane in the Configuration Parameters dialog box or set the parameter <code>PreserveIfCondition</code> to on.</p> |
| <p>The minimum number of characters specified for generating name mangling strings is less than four. You can use this option to minimize the likelihood that parameter and signal names will change during code generation when the model changes. Use of this option assists with minimizing code differences between file versions, decreasing the effort to perform code reviews. (See DO-331, Section MB.6.3.4.e – Source code is traceable to low-level requirements.)</p> | <p>Set Minimum mangle length (Simulink Coder) on the Code Generation > Symbols pane in the Configuration Parameters dialog box or the parameter <code>MangleLength</code> to a value of 4 or greater.</p> |

Action Results

Clicking **Modify Settings** configures model code generation settings that can impact safety.

Subchecks depend on the results of the subchecks noted with **D** in the results table in the Model Advisor window.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “hisl_0038: Configuration Parameters > Code Generation > Comments” (Simulink)
- “hisl_0039: Configuration Parameters > Code Generation > Interface” (Simulink)
- “hisl_0047: Configuration Parameters > Code Generation > Code Style” (Simulink)
- “hisl_0049: Configuration Parameters > Code Generation > Symbols” (Simulink)

- “Model Configuration Parameters: Code Generation Comments” (Simulink Coder)“Model Configuration Parameters: Code Generation Comments” (Simulink Coder)
- “Model Configuration Parameters: Code Generation Symbols” (Simulink Coder)
- “Model Configuration Parameters: Code Generation Interface” (Simulink Coder)
- “Model Configuration Parameters: Code Generation Code Style” (Embedded Coder)
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

Check safety-related diagnostic settings for saving

Check ID: `mathworks.do178.SavingDiagnosticsSet`

Check model configuration for diagnostic settings that apply to saving model files

Description

This check verifies that model configuration parameters are set optimally for saving a model for a safety-related application.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The diagnostic that detects whether a model contains disabled library links before the model is saved is set to none or warning . If this condition is undetected, incorrect code might be generated. | Set Block diagram contains disabled library links (Simulink) on the All Parameters tab in 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 (Simulink) on the All Parameters tab in 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.

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.3.b - Software architecture is consistent

- “hisl_0036: Configuration Parameters > Diagnostics > Saving” (Simulink)
- “Identify disabled library links” (Simulink)
- “Save a Model” (Simulink)
- “Model Parameters” (Simulink)

Check for blocks that do not link to requirements

Check ID: `mathworks.do178.RequirementInfo`

Check whether Simulink blocks and Stateflow objects link to a requirements document.

Description

This check verifies whether Simulink blocks and Stateflow objects link to a document containing engineering requirements for traceability.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Blocks do not link to a requirements document. | Link to requirements document. See “Link to Requirements Document Using Selection-Based Linking”. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Tip

Run this check from the top model or subsystem that you want to check.

See Also

- DO-331, Section MB.6.3.1.f - High-level requirements trace to system requirements
- DO-331, Section MB.6.3.2.f - Low-level requirements trace to high-level requirements
- “Requirements Traceability”

Check state machine type of Stateflow charts

Check ID: mathworks.do178.hisf_0001

Identify whether Stateflow charts are all Mealy or all Moore charts.

Description

Compares the state machine type of all Stateflow charts to the type that you specify in the input parameters.

Available with Simulink Verification and Validation.

Input Parameters

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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Section MB.6.3.1.b - High-level requirements are accurate and consistent
- DO-331, Section MB.6.3.1.e - High-level requirements conform to standards
- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- DO-331, Section MB.6.3.2.e - Low-level requirements conform to standards
- DO-331, Section MB.6.3.3.b - Software architecture is consistent
- DO-331, Section MB.6.3.3.e - Software architecture conform to standards
- “hisf_0001: Mealy and Moore semantics” (Simulink)
- “Overview of Mealy and Moore Machines” (Stateflow)
- “Chart Properties” (Simulink)
- “Chart Architecture” (Simulink)

Check Stateflow charts for ordering of states and transitions

Check ID: mathworks.do178.hisf_0002

Identify Stateflow charts that have **User specified state/transition execution order** cleared.

Description

Identify Stateflow charts that have **User specified state/transition execution order** cleared, and therefore do not use explicit ordering of parallel states and transitions.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Stateflow charts have User specified state/transition execution order cleared. | For the specified charts, in the Chart Properties dialog box, select User specified state/transition execution order . |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

Action Results

Clicking **Modify** selects **User specified state/transition execution order** for the specified charts.

See Also

- DO-331, Section MB.6.3.3.b - Software architecture is consistent
- DO-331, Section MB.6.3.3.e - Software architecture conform to standards
- “hisf_0002: User-specified state/transition execution order” (Simulink)

- “Transition Testing Order in Multilevel State Hierarchy” (Stateflow)
- “Execution Order for Parallel States” (Stateflow)
- “Chart Properties” (Simulink)
- “Chart Architecture” (Simulink)

Check Stateflow debugging options

Check ID: mathworks.do178.hisf_0011

Check the Stateflow debugging settings.

Description

Verify the following debugging settings.

- **Wrap on overflow**
- **Simulation range checking**
- **Detect Cycles**

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Any of the following: <ul style="list-style-type: none"> • Wrap on overflow is not set to error. • Simulation range checking is not set to error. • Detect Cycles is cleared. | In the Configuration Parameters dialog box, set: <ul style="list-style-type: none"> • Diagnostics > Data Validity > Wrap on overflow to error. • Diagnostics > Data Validity > Simulation range checking to error. In the model window, select: <ul style="list-style-type: none"> • Simulation > Debug > MATLAB & Stateflow Error Checking Options > Detect Cycles. |

Capabilities and Limitations

- Does not run on library models.
- Does not analyze content of library linked blocks.
- Allows exclusions of blocks and charts.

Action Results

Clicking **Modify** selects the specified debugging options.

See Also

- DO-331, Section MB.6.3.1.b - High-level requirements are accurate and consistent
- DO-331, Section MB.6.3.1.e - High-level requirements conform to standards
- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- DO-331, Section MB.6.3.2.e - Low-level requirements conform to standards
- “hisf_0011: Stateflow debugging settings” (Simulink)
- “Chart Properties” (Simulink)
- “Chart Architecture” (Simulink)

Check usage of lookup table blocks

Check ID: `mathworks.do178.LUTRangeCheckCode`

Check for lookup table blocks that do not generate out-of-range checking code.

Description

This check verifies that the following blocks generate code to protect against inputs that fall outside the range of valid breakpoint values:

- 1-D Lookup Table
- 2-D Lookup Table
- n-D Lookup Table
- Prelookup

This check also verifies that Interpolation Using Prelookup blocks generate code to protect against inputs that fall outside the range of valid index values.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The lookup table block does not generate out-of-range checking code. | Change the setting on the block dialog box so that out-of-range checking code is generated. <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. • For the Interpolation Using Prelookup block, clear the check box for Remove protection against out-of-range index in generated code. |

Capabilities and Limitations

- Runs on library models.

- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

Action Results

Clicking **Modify** verifies that lookup table blocks are set to generate out-of-range checking code.

See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- “hisl_0033: Usage of Lookup Table blocks” (Simulink)
- n-D Lookup Table (Simulink) block
- Prelookup (Simulink) block
- Interpolation Using Prelookup (Simulink) block

Check MATLAB Code Analyzer messages

Check ID: mathworks.do178.himl_0004

Check MATLAB Functions for `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs.

Description

Verifies `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs for:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <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>. |

| Condition | Recommended Action |
|--|--|
| <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Sections MB.6.3.1.b and MB.6.3.2.b - Accuracy and consistency
- “Check Code for Errors and Warnings” (MATLAB)
- “himl_0004: MATLAB Code Analyzer recommendations for code generation” (Simulink)

Check MATLAB code for global variables

Check ID: mathworks.do178.himl_0005

Check for global variables in MATLAB code.

Description

Verifies that global variables are not used in any of the following:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Global variables are used in one or more of the following: <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Sections MB.6.3.3.b ‘Consistency’
- “himl_0005: Usage of global variables in MATLAB functions” (Simulink)

Check for inconsistent vector indexing methods

Check ID: mathworks.do178.hisl_0021

Identify blocks with inconsistent indexing method.

Description

Using inconsistent block indexing methods can result in modeling errors. You should use a consistent vector indexing method for all blocks. This check identifies blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified. | Modify the model to use a single consistent indexing method. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “hisl_0021: Consistent vector indexing method” (Simulink)

Check for MATLAB Function interfaces with inherited properties

Check ID: mathworks.do178.himl_0002

Identify MATLAB Functions that have inputs, outputs or parameters with inherited complexity or data type properties.

Description

The check identifies MATLAB Functions with inherited complexity or data type properties. A results table provides links to MATLAB Functions that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| MATLAB Functions have inherited interfaces. | <p>Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Functions identified in the results.</p> <p>If applicable, using the “MATLAB Function Block Editor” (Simulink), make the following modifications in the “Ports and Data Manager” (Simulink):</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. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “himl_0002: Strong data typing at MATLAB function boundaries” (Simulink)

Check MATLAB Function metrics

Check ID: mathworks.do178.himl_0003

Display complexity and code metrics for MATLAB Functions. Report metric violations.

Description

This check provides complexity and code metrics for MATLAB Functions. The check additionally reports metric violations. A results table provides links to MATLAB Functions that violate the complexity input parameters.

Available with Simulink Verification and Validation.

Input Parameters

Maximum effective lines of code per function

Provide the maximum effective lines of code per function. Effective lines do not include empty lines, comment lines, or lines with a function `end` keyword.

Minimum density of comments

Provide minimum density of comments. Density is ratio of comment lines to total lines of code.

Maximum cyclomatic complexity per function

Provide maximum cyclomatic complexity per function. Cyclomatic complexity is the number of linearly independent paths through the source code.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| MATLAB Function violates the complexity input parameters. | For the MATLAB Function: <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Sections MB.6.3.1.e - High-level requirements conform to standards
- DO-331, Sections MB.6.3.2.e - Low-level requirements conform to standards
- “himl_0003: Limitation of MATLAB function complexity” (Simulink)

Check for blocks not recommended for C/C++ production code deployment

Check ID: `mathworks.do178.PCGSupport`

Identify blocks not supported by code generation or not recommended for C/C++ production code deployment.

Description

This check partially identifies model constructs that are not recommended for C/C++ production code generation as identified in the Simulink Block Support (Simulink Coder) tables for Simulink Coder and Embedded Coder. If you are using blocks with support notes for code generation, review the information and follow the given advice.

Available with Simulink Verification and Validation and Embedded Coder.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains blocks that should not be used for production code deployment. | Consider replacing the blocks listed in the results. Click an element from the list of questionable items to locate condition. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “hisl_0020: Blocks not recommended for MISRA C:2012 compliance” (Simulink)
- “Supported Products and Block Usage” (Simulink Coder)

Check for variant blocks with 'Generate preprocessor conditionals' active

Check ID: mathworks.do178.VariantBlock

Check variant block parameters for settings that might result in code that does not trace to requirements.

Description

This check verifies that variant block parameters for code generation are set to trace to requirements.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The option to generate preprocessor conditionals is selected in one or more variant blocks in the model. | In order to simplify the tracing of code to requirements, consider clearing the option to generate preprocessor conditionals in variant blocks. |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331 Section MB.6.3.4.e — Source code is traceable to low-level requirements
- “hisl_0023: Verification of model and subsystem variants” (Simulink)

Check Stateflow charts for uniquely defined data objects

Check ID: `mathworks.do178.hisl_0061`

Identify Stateflow charts that include data objects that are not uniquely defined.

Description

This check searches your model for local data in Stateflow charts that is not uniquely defined.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The Stateflow chart contains a data object identifier defined in two or more scopes. | For the identified chart, do one of the following: <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- “hisl_0061: Unique identifiers for clarity” (Simulink)

Check usage of Math Operations blocks

Check ID: mathworks.do178.MathOperationsBlocksUsage

Identify usage of Math Operation blocks that might impact safety.

Description

This check inspects the usage of the following blocks:

- Abs
- Gain
- Math Function
 - Natural logarithm
 - Common (base 10) logarithm
 - Remainder after division
 - Reciprocal
- Assignment

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <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 | <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> |

| Condition | Recommended Action |
|--|--|
| representable by the data type. This condition results in an overflow in the generated code. | |
| The model or subsystem contains Gain blocks with a of value 1 or an identity matrix. | If you are using Gain blocks as buffers, consider replacing them with Signal Conversion blocks. |
| The model or subsystem contains Math Function - Natural logarithm (log) blocks that might result in non-finite output signals. Non-finite signals are not supported in real-time embedded systems. | When using the Math Function block with a log function, protect the input to the block from being less than or equal to zero. Otherwise, the output can produce a NaN or -Inf and result in a run-time error in the generated code. |
| The model or subsystem contains Math Function - Common (base 10) (base 10 logarithm) blocks that might result in non-finite output signals. Non-finite signals are not supported in real-time embedded systems. | When using the Math Function block with a log10 function, protect the input to the block from being less than or equal to zero. Otherwise, the output can produce a NaN or -Inf and result in a run-time error in the generated code. |
| The model or subsystem contains Math Function - Remainder after division (rem) blocks that might result in non-finite output signals. Non-finite signals are not supported in real-time embedded systems. | When using the Math Function block with a rem function, protect the second input to the block from being equal to zero. Otherwise the output can produce a Inf or -Inf and result in a run-time error in the generated code. |
| The model or subsystem contains Math Function - Reciprocal (reciprocal) blocks that might result in non-finite output signals. Non-finite signals are not supported in real-time embedded systems. | When using the Math Function block with a reciprocal function, protect the input to the block from being equal to zero. Otherwise the output can produce a Inf or -Inf and result in a run-time error in the generated code. |

| Condition | Recommended Action |
|--|--|
| The model or subsystem might contain Assignment blocks with incomplete array initialization that do not have block parameter Action if any output element is not assigned set to Error or Warning . | Set block parameter Action if any output element is not assigned to one of the recommended values: <ul style="list-style-type: none"> • Error, if Assignment block is not in an Iterator subsystem. • Warning, if Assignment block is in an Iterator subsystem. |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331 Section MB.6.3.1.d – High-level requirements are verifiable
- DO-331 Section MB.6.3.2.d – Low-level requirements are verifiable
- MISRA C:2012, Dir 4.1
- MISRA C:2012, Rule 9.1
- “hisl_0001: Usage of Abs block” (Simulink)
- “hisl_0002: Usage of Math Function blocks (rem and reciprocal)” (Simulink)
- “hisl_0004: Usage of Math Function blocks (natural logarithm and base 10 logarithm)” (Simulink)
- “hisl_0029: Usage of Assignment blocks” (Simulink)

Check usage of Signal Routing blocks

Check ID: mathworks.do178.SignalRoutingBlockUsage

Identify usage of Signal Routing blocks that might impact safety.

Description

This check identifies model or subsystem Switch blocks that might generate code with inequality operations ($\sim=$) 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 ($\sim=$) 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. | 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

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- MISRA C:2012, Dir 1.1
- “hisl_0034: Usage of Signal Routing blocks” (Simulink)

Check usage of Logic and Bit Operations blocks

Check ID: mathworks.do178.LogicBlockUsage

Identify usage of Logical Operator and Bit Operations blocks that might impact safety.

Description

This check inspects the usage of:

- Blocks that compute relational operators, including Relational Operator, Compare To Constant, Compare To Zero, and Detect Change blocks
- Logical Operator blocks

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains a block computing a relational operator that is operating on different data types. The condition can lead to unpredictable results in the generated code. | For the identified blocks, use common data types as inputs. You can use Data Type Conversion blocks to change input data types. |
| The model or subsystem contains a block computing a relational operator that does not have Boolean output. The condition can lead to unpredictable results in the generated code. | For the specified blocks, on the Block Parameters > Signal Attributes pane, set the Output data type to <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 <code>boolean</code>. • In the Configuration Parameters dialog box, on the All Parameters tab, consider selecting the Implement logic signals as boolean data (vs. double). |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- MISRA C:2012, Dir 1.1
- MISRA C:2012, Rule 10.1
- “hisl_0016: Usage of blocks that compute relational operators” (Simulink)
- “hisl_0017: Usage of blocks that compute relational operators (2)” (Simulink)
- “hisl_0018: Usage of Logical Operator block” (Simulink)

Check usage of Ports and Subsystems blocks

Check ID: mathworks.do178.PortsSubsystemsUsage

Identify usage of Ports and Subsystems blocks that might impact safety.

Description

This check inspects the usage of these blocks:

- For Iterator
- While Iterator
- If
- Switch Case

The check does not flag Switch Case blocks that do not use integer data types or enumeration values for inputs. To comply with “hisl_0011: Usage of Switch Case blocks and Action Subsystem blocks” (Simulink) – C, use an integer data type or an enumeration value for the inputs to 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. |

| Condition | Recommended Action |
|--|---|
| <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> |
| <p>The model or subsystem contains an Switch Case block without a default case.</p> | <p>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.</p> |
| <p>The model or subsystem contains a Switch Case block with an output port that does not connect to a Switch Case Action Subsystem block.</p> | <p>Verify that output ports of the Switch Case blocks connect to Switch Case Action Subsystem blocks.</p> |

| Condition | Recommended Action |
|---|--|
| <p>The model or subsystem contains one of the following time-dependent blocks in a For Iterator or While Iterator subsystem:</p> <ul style="list-style-type: none"> • Discrete Filter • Discrete FIR Filter • Discrete State-Space • Discrete Transfer Fcn • Discrete Zero-Pole • Transfer Fcn First Order • Transfer Fcn Lead or Lag • Transfer Fcn Real Zero • Discrete Derivative • Discrete Transfer Fcn (with initial outputs) • Discrete Transfer Fcn (with initial states) • Discrete Zero-Pole (with initial outputs) • Discrete Zero-Pole (with initial states) | <p>In the model or subsystem, consider removing the time-dependent blocks.</p> |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- DO-331, Section MB.6.3.3.b—Software architecture is consistent
- DO-331, Sections MB.6.3.1.g and MB.6.3.2.g - Algorithms are accurate
- DO-331, Section MB.6.3.1.e – High-level requirements conform to standards
- DO-331, Section MB.6.3.2.e – Low-level requirements conform to standards

- DO-331, Section MB.6.3.1.b - High-level requirements are accurate and consistent
- DO-331, Section MB.6.3.2.b - Low-level requirements are accurate and consistent
- MISRA C:2012, Rule 14.2
- MISRA C:2012, Rule 16.4
- MISRA C:2012, Dir 4.1
- “hisl_0006: Usage of While Iterator blocks” (Simulink)
- “hisl_0007: Usage of While Iterator subsystems” (Simulink)
- “hisl_0008: Usage of For Iterator Blocks” (Simulink)
- “hisl_0009: Usage of For Iterator Subsystem blocks” (Simulink)
- “hisl_0011: Usage of Switch Case blocks and Action Subsystem blocks” (Simulink)

Display model version information

Check ID: mathworks.do178.MdlChecksum

Display model version information in your report.

Description

This check displays the following information for the current model:

- Version number
- Author
- Date
- Model checksum

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Could not retrieve model version and checksum information. | This summary is provided for your information. No action is required. |

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- “Reports for Code Generation” (Simulink Coder)
- Radio Technical Commission for Aeronautics (RTCA) for information on the DO-178C Software Considerations in Airborne Systems and Equipment Certification and related standards

IEC 61508, IEC 62304, ISO 26262, and EN 50128 Checks

In this section...

- “IEC 61508, IEC 62304, ISO 26262, and EN 50128 Checks” on page 3-88
- “Check model object names” on page 3-90
- “Display model metrics and complexity report” on page 3-93
- “Check for unconnected objects” on page 3-95
- “Check for root Inports with missing properties” on page 3-97
- “Check for MATLAB Function interfaces with inherited properties” on page 3-99
- “Check MATLAB Function metrics” on page 3-101
- “Check for root Inports with missing range definitions” on page 3-103
- “Check for root Outports with missing range definitions” on page 3-105
- “Check for blocks not recommended for C/C++ production code deployment” on page 3-107
- “Check usage of Stateflow constructs” on page 3-108
- “Check state machine type of Stateflow charts” on page 3-114
- “Check for model objects that do not link to requirements” on page 3-116
- “Check for inconsistent vector indexing methods” on page 3-118
- “Check MATLAB Code Analyzer messages” on page 3-120
- “Check MATLAB code for global variables” on page 3-122
- “Check usage of Math Operations blocks” on page 3-124
- “Check usage of Signal Routing blocks” on page 3-126
- “Check usage of Logic and Bit Operations blocks” on page 3-128
- “Check usage of Ports and Subsystems blocks” on page 3-130
- “Display configuration management data” on page 3-134

IEC 61508, IEC 62304, ISO 26262, and EN 50128 Checks

IEC 61508, IEC 62304, ISO 26262, and EN 50128 checks facilitate designing and troubleshooting models, subsystems, and the corresponding generated code for applications to comply with IEC 61508-3, IEC 62304, ISO 26262-6, or EN 50128.

The Model Advisor performs a checkout of the Simulink Verification and Validation license when you run the IEC 61508, IEC 62304, ISO 26262, or EN 50128 checks.

Tips

If your model uses model referencing, run the IEC 61508, IEC 62304, ISO 26262, or EN 50128 checks on all referenced models before running them on the top-level model.

See Also

- IEC 61508-3 Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements
- IEC 62304 Medical device software - Software life cycle processes
- ISO 26262-6 Road vehicles - Functional safety - Part 6: Product development: Software level
- EN 50128 Railway applications - Communications, signalling and processing systems - Software for railway control and protection systems
- Embedded Coder documentation:
 - “IEC 61508 Standard” (Embedded Coder)
 - “IEC 62304 Standard” (Embedded Coder)
 - “ISO 26262 Standard” (Embedded Coder)
 - “EN 50128 Standard” (Embedded Coder)

Check model object names

Check ID: `mathworks.iec61508.hisl_0032`

Check model object names.

Description

This check verifies that the following model object names comply with your own modeling guidelines or the high-integrity modeling guidelines. The check also verifies that the model object does not use a reserved name.

- Blocks
- Signals
- Parameters
- Busses
- Stateflow objects

Reserved names:

- MATLAB keywords
- Reserved keywords for C, C++, and code generation. For complete list, see “Reserved Keywords” (Simulink Coder) in the Simulink Coder documentation.
- `int8`, `uint8`
- `int16`, `uint16`
- `int32`, `uint32`
- `inf`, `Inf`
- `NaN`, `nan`
- `eps`
- `intmin`, `intmax`
- `realmin`, `realmax`
- `pi`
- `infinity`
- `Nil`

Note: For some cases, the Model Advisor reports an issue in multiple subchecks of this check.

Available with Simulink Verification and Validation.

Input Parameters

To specify the naming standard and model object names that the check flags, use the Model Advisor Configuration Editor.

- 1 Open the Model Configuration Editor and navigate to **Check model object names**. In the **Input Parameters** pane, for each of the model objects, select one of the following:
 - **MAAB** to use the MAAB naming standard. When you select MAAB, the check uses the regular expression $(^{\{32, \}}$) | ([^a-zA-Z_0-9]) | (^ \d) | (^) | (__) | (^_) | (_$)$ to verify that names:
 - Use these characters: a-z, A-Z, 0-9, and the underscore (_).
 - Do not start with a number.
 - Do not use underscores at the beginning or end of a string.
 - Do not use more than one consecutive underscore.
 - Use strings that are less than 32 characters.
 - **Custom** to use your own naming standard. When you select Custom, you can enter your own **Regular expression for prohibited <model object> names**. For example, if you want to allow more than one consecutive underscore, enter $(^{\{32, \}}$) | ([^a-zA-Z_0-9]) | (^ \d) | (^) | (^_) | (_$)$
 - **None** if you do not want the check to verify the model object name
- 2 Click **Apply**.
- 3 Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The model object names do not comply with the naming standard specified in the input parameters. | Update the model object names to comply with your own or the high-integrity guidelines. |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- “hisl_0032: Model object names” (Simulink)
- MAAB guideline, Version 3.0: jc_0201: Usable characters for Subsystem names (Simulink)
- MAAB guideline, Version 3.0: jc_0211: Usable characters for Inport blocks and Outport blocks (Simulink)
- MAAB guideline, Version 3.0: jc_0221: Usable characters for signal line names (Simulink)
- MAAB guideline, Version 3.0: jc_0231: Usable characters for block names (Simulink)
- MAAB guideline, Version 3.0: na_0030: Usable characters for Simulink Bus names (Simulink)

Display model metrics and complexity report

Check ID: `mathworks.iec61508.MdlMetricsInfo`

Display number of elements and name, level, and depth of subsystems for the model or subsystem.

Description

The IEC 61508, ISO 26262, and EN 50128 standards recommend the usage of size and complexity metrics to assess the software under development. This check provides metrics information for the model. The provided information can be used to inspect whether the size or complexity of the model or subsystem exceeds given limits. The check displays:

- A block count for each Simulink block type contained in the given model, including library linked blocks.
- A count of Stateflow constructs in the given model (if applicable).
- Name, level, and depth of the subsystems contained in the given model (if applicable).
- The maximum subsystem depth of the given model.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|-----------|---|
| N/A | This summary is provided for your information. No action is required. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- IEC 61508-3, Table B.9 (1) - Software module size limit, Table B.9 (2) - Software complexity control

- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1a) - Enforcement of low complexity, Table 3 (a) - Hierarchical structure of software components, Table 3 (b) - Restricted size of software components, and Table 3 (c) - Restricted size of interfaces
- EN 50128, Table A.12 (8) - Limited size and complexity of Functions, Subroutines and Methods and (9) Limited number of subroutine parameters
- `sldiagnostics` in the Simulink documentation
- “Cyclomatic Complexity for Stateflow Charts” in the Simulink Verification and Validation documentation

Check for unconnected objects

Check ID: `mathworks.iec61508.UnconnectedObjects`

Identify unconnected lines, input ports, and output ports in the model.

Description

Unconnected objects are likely to cause problems propagating signal attributes such as data, type, sample time, and dimensions.

Ports connected to Ground or Terminator blocks pass this check.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| There are unconnected lines, input ports, or output ports in the model or subsystem. | <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128, Table A.4 (11) - Language Subset
- “Signal Basics” (Simulink)

Check for root Inports with missing properties

Check ID: `mathworks.iec61508.RootLevelInports`

Identify root model Inport blocks with missing or inherited sample times, data types or port dimensions.

Description

Using root model Inport blocks that do not have defined sample time, data types or port dimensions can lead to undesired simulation results. Simulink back-propagates dimensions, sample times, and data types from downstream blocks unless you explicitly assign these values. You can specify Inport block properties with block parameters or Simulink signal objects that explicitly resolve to the connected signal lines. When you run the check, a results table provides links to Inport blocks and signal objects that do not pass, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Missing port dimension — Model contains Inport blocks with inherited port dimensions. | For the listed Inport blocks and Simulink signal objects, specify port dimensions. |
| Missing signal data type — Model contains Inport blocks with inherited data types. | For the listed Inport blocks and Simulink signal objects, specify data types. |
| Missing port sample time — Model contains Inport blocks with inherited sample times. | For the listed Inport blocks and Simulink signal objects, specify sample times. The sample times for root Inports with bus type must match the sample times specified at the leaf elements of the bus object. |
| Implicit resolution to a Simulink signal object — Model contains Inport block signal names that implicitly resolve to a Simulink signal object in the base workspace, model workspace, or Simulink data dictionary. | For the listed Simulink signal objects, in the property dialog, select signal property Signal name must resolve to Simulink signal object . |

Capabilities and Limitations

- Does not run on library models.
- Allows exclusions of blocks and charts.

Tips

The following configurations pass this check:

- **Configuration Parameters > Solver > Periodic sample time constraint** is set to **Ensure sample time independent**
- For export-function models, *inherited sample time* is not flagged.

See Also

- IEC 61508-3, Table B.9 (6) - Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-4, Table 2 (2) - Precisely defined interfaces
- EN 50128, Table A.3 (19) - Fully Defined Interface
- “About Data Types in Simulink” (Simulink)
- “Determine Output Signal Dimensions” (Simulink)
- “Specify Sample Time” (Simulink)
- “hisl_0024: Inport interface definition” (Simulink)

Check for MATLAB Function interfaces with inherited properties

Check ID: mathworks.iec61508.himl_0002

Identify MATLAB Functions that have inputs, outputs or parameters with inherited complexity or data type properties.

Description

The check identifies MATLAB Functions with inherited complexity or data type properties. A results table provides links to MATLAB Functions that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| MATLAB Functions have inherited interfaces. | <p>Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Functions identified in the results.</p> <p>If applicable, using the “MATLAB Function Block Editor” (Simulink), make the following modifications in the “Ports and Data Manager” (Simulink):</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. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table B.9 (6) - Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1f) - Use of unambiguous graphical representation
- EN 50128, Table A.1 (11) - Software Interface Specifications
- “himl_0002: Strong data typing at MATLAB function boundaries” (Simulink)

Check MATLAB Function metrics

Check ID: mathworks.iec61508.himl_0003

Display complexity and code metrics for MATLAB Functions. Report metric violations.

Description

The IEC 61508, ISO 26262, and EN 50128 standards recommend the usage of size and complexity metrics to assess the software under development. This check provides complexity and code metrics for MATLAB Functions. The check additionally reports metric violations.

A results table provides links to MATLAB Functions that violate the complexity input parameters.

Available with Simulink Verification and Validation.

Input Parameters

Maximum effective lines of code per function

Provide the maximum effective lines of code per function. Effective lines do not include empty lines, comment lines, or lines with a function `end` keyword.

Minimum density of comments

Provide minimum density of comments. Density is ratio of comment lines to total lines of code.

Maximum cyclomatic complexity per function

Provide maximum cyclomatic complexity per function. Cyclomatic complexity is the number of linearly independent paths through the source code.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| MATLAB Function violates the complexity input parameters. | For the MATLAB Function: <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. |

| Condition | Recommended Action |
|-----------|--|
| | <ul style="list-style-type: none">• If cyclomatic complexity per function is too high, further divide the MATLAB Function. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table B.9 (6) - Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1f) - Use of unambiguous graphical representation
- EN 50128, Table A.1(11) - Software Interface Specifications
- “himl_0003: Limitation of MATLAB function complexity” (Simulink)

Check for root Inports with missing range definitions

Check ID: `mathworks.iec61508.InportRange`

Identify root level Inport blocks with missing or erroneous minimum or maximum range values.

Description

The check identifies root level Inport blocks with missing or erroneous minimum or maximum range values. You can specify Inport block minimum and maximum values with block parameters or Simulink signal objects that explicitly resolve to the connected signal lines. A results table provides links to Inport blocks and signal objects that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Missing range — Model contains Inport blocks with numeric data types that have missing range parameters (minimum and/or maximum). | For the listed Inport blocks and Simulink signal objects, specify scalar minimum and maximum parameters. |
| Missing range(s) for bus object — Bus objects defining the Inport blocks have leaf elements with missing ranges. | For the listed leaf elements, to specify the model interface range, provide scalar minimum and maximum parameters . |
| Range specified will be ignored — Minimum or maximum values at Inports or Simulink signal objects are not supported for bus data types. The values are ignored during range checking. | To enable range checking, specify minimum and maximum signal values on the leaf elements of the bus objects defining the data type. |
| No data type specified — Model contains Inport blocks or Simulink signal objects with inherited data types. | Specify one of the supported data types: <ul style="list-style-type: none"> • Enum • <code>Simulink.AliasType</code> • <code>Simulink.Bus</code> • <code>Simulink.NumericType</code> • build-in |

| Condition | Recommended Action |
|--|--|
| Implicit resolution to a Simulink signal object — Model contains Inport block signal names that implicitly resolve to a Simulink signal object in the base workspace, model workspace, or Simulink data dictionary. | For the listed Simulink signal objects, in the property dialog, select signal property Signal name must resolve to Simulink signal object . |

Capabilities and Limitations

- Does not run on library models.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table B.9 (6) – Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-4, 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” (Simulink)

Check for root Outputports with missing range definitions

Check ID: `mathworks.iec61508.OutputportRange`

Identify root level Outputport blocks with missing or erroneous minimum or maximum range values.

Description

The check identifies root level Outputport blocks with missing or erroneous minimum or maximum range values. You can specify Outputport 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 Outputport blocks that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Missing range — Model contains Outputport blocks with numeric data types that have missing range parameters (minimum and/or maximum). | For the listed Outputport blocks and Simulink signal objects, specify scalar minimum and maximum parameters. |
| Missing range(s) for bus object — Bus objects defining the Outputport blocks have leaf elements with missing ranges. | For the listed leaf elements, to specify the model interface range, provide scalar minimum and maximum parameters. |
| Range specified at Outputport will be ignored — Minimum or maximum values at Outputports 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. |
| No bus data type specified — Model contains Outputport block or Simulink signal objects with inherited bus data types. | For the Outputport blocks and Simulink signal objects, specify one of the supported data types: <ul style="list-style-type: none"> • Enum • <code>Simulink.AliasType</code> • <code>Simulink.Bus</code> |

| Condition | Recommended Action |
|--|--|
| | <ul style="list-style-type: none"> • 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

- Does not run on library models.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table B.9 (6) – Fully defined interface
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-4, 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” (Simulink)

Check for blocks not recommended for C/C++ production code deployment

Check ID: `mathworks.iec61508.PCGSupport`

Identify blocks not supported by code generation or not recommended for C/C++ production code deployment.

Description

This check partially identifies model constructs that are not recommended for C/C++ production code generation as identified in the Simulink Block Support (Simulink Coder) tables for Simulink Coder and Embedded Coder. If you are using blocks with support notes for code generation, review the information and follow the given advice.

Available with Simulink Verification and Validation and Embedded Coder.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains blocks that should not be used for production code deployment. | Consider replacing the blocks listed in the results. Click an element from the list of questionable items to locate condition. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.4 (11) - Language Subset
- “Supported Products and Block Usage” (Simulink Coder)

Check usage of Stateflow constructs

Check ID: `mathworks.iec61508.StateflowProperUsage`

Identify usage of Stateflow constructs that might impact safety.

Description

This check identifies instances of Stateflow software being used in a way that can impact an application's safety, including:

- Use of strong data typing
- Port name mismatches
- Scope of data objects and events
- Formatting of state action statements
- Ordering of states and transitions
- Unreachable code
- Indeterminate execution time

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <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)” (Simulink) • IEC 61508-3, Table A.3 (2) - Strongly typed programming language • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1c) - Enforcement of strong typing | <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"> • EN 50128, Table A.4 (8) - Strongly Typed Programming Language | |
| <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 • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets • EN 50128, Table A.4 (11) - Language Subset | <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 • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets • EN 50128, Table A.4 (11) - Language Subset | <p>Define local data at the chart level or below.</p> |

| Condition | Recommended Action |
|--|---|
| <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 • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets • EN 50128, Table A.4 (11) - Language Subset | <p>Add missing new lines.</p> |
| <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” (Simulink) • IEC 61508-3, Table A.3 (3) - Language subset • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1f) - Use of unambiguous graphical representation • EN 50128, Table A.4 (11) - Language Subset | <p>For the specified charts, in the Chart Properties dialog box, select User specified state/transition execution order.</p> |

| Condition | Recommended Action |
|--|---|
| <p>Any of the following:</p> <ul style="list-style-type: none"> • Wrap on overflow is not set to error. • Simulation range checking is not set to error. • Detect Cycles is cleared. <p>See:</p> <ul style="list-style-type: none"> • “hisf_0011: Stateflow debugging settings” (Simulink) • IEC 61508-3, Table A.3 (3) - Language subset • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1d) - Use of defensive implementation techniques • EN 50128, Table A.3 (1) - Defensive Programming • EN 50128, Table A.4 (11) - Language Subset | <p>In the Configuration Parameters dialog box, set:</p> <ul style="list-style-type: none"> • Diagnostics > Data Validity > Wrap on overflow to error. • Diagnostics > Data Validity > Simulation range checking to error. <p>In the model window, select:</p> <ul style="list-style-type: none"> • Simulation > Debug > MATLAB & Stateflow Error Checking Options > 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” (Simulink) • IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (5) - Design and coding standards • IEC 62304, 5.5.3 - Software Unit acceptance criteria • ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1e) - Use of established design principles, Table 1 (1f) - Use of unambiguous graphical representation, Table 1 (1g) - Use of style guides, Table 1 (1h) - Use of naming conventions • EN 50128, Table A.4 (11) - Language Subset, Table A.12 (1) - Coding Standard, Table A.12 (2) - Coding Style Guide | <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

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts. Exclusions will not work for library linked charts.

See Also

See the following topics in the Stateflow documentation:

- “Strong Data Typing with Simulink I/O” (Stateflow)
- “Property Fields” (Stateflow)

- “How Events Work in Stateflow Charts” (Stateflow)
- “Add Stateflow Data” (Stateflow)
- “Label States” (Stateflow)
- “Chart Properties” (Simulink)
- “Chart Architecture” (Simulink)

Check state machine type of Stateflow charts

Check ID: mathworks.iec61508.hisf_0001

Identify whether Stateflow charts are all Mealy or all Moore charts.

Description

Compares the state machine type of all Stateflow charts to the type that you specify in the input parameters.

Available with Simulink Verification and Validation.

Input Parameters

Mealy or Moore

Check whether charts use the same state machine type, and are all Mealy or all Moore charts.

Mealy

Check whether all charts are Mealy charts.

Moore

Check whether all charts are Moore charts.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The input parameter is set to Mealy or Moore and charts in the model use either of the following: <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.4 (11) - Language Subset
- “hisf_0001: Mealy and Moore semantics” (Simulink)
- “Overview of Mealy and Moore Machines” (Stateflow) in the Stateflow documentation.
- “Chart Properties” (Simulink)
- “Chart Architecture” (Simulink)

Check for model objects that do not link to requirements

Check ID: `mathworks.iec61508.RequirementInfo`

Check whether Simulink blocks and Stateflow objects link to a requirements document.

Description

This check verifies whether Simulink blocks and Stateflow objects link to a document containing engineering requirements for traceability.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Blocks do not link to a requirements document. | Link to requirements document. See “Link to Requirements Document Using Selection-Based Linking”. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Tip

Run this check from the top model or subsystem that you want to check.

See Also

- IEC 61508-3, Table A.2 (12) - Computer-aided specification and design tools, Table A.2 (9) - Forward traceability between the software safety requirements specification and software architecture, Table A.2 (10) - Backward traceability between the software safety requirements specification and software architecture, Table A.4 (8) - Forward traceability between the software safety requirements specification and software design, Table A.8 (1) - Impact analysis
- IEC 62304, 5.2 - Software requirements analysis, 7.4.2 - Analyze impact of software changes on existing risk control measures

- ISO 26262-6, Table 8 (1a) - Documentation of the software unit design in natural language, ISO 26262-6: 7.4.2.a - The verifiability of the software architectural design, ISO 26262-8: 8.4.3 Change request analysis
- EN 50128, Table A.3 (23) - Modeling supported by computer aided design and specification tools, Table D.58 - Traceability, Table A.10 (1) - Impact Analysis
- “Requirements Traceability”

Check for inconsistent vector indexing methods

Check ID: mathworks.iec61508.hisl_0021

Identify blocks with inconsistent indexing method.

Description

Using inconsistent block indexing methods can result in modeling errors. You should use a consistent vector indexing method for all blocks. This check identifies blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem contains blocks with inconsistent indexing methods. The indexing methods are zero-based, one-based or user-specified. | Modify the model to use a single consistent indexing method. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508–3, Table A.3 (3) - Language subset, Table A.4 (5) - Design and coding standards
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1e) - Use of established design principles, Table 1 (1f) - Use of unambiguous graphical representation, Table 1 (1g) - Use of style guides, Table 1 (1h) - Use of naming conventions
- EN 50128, Table A.4 (11) - Language Subset, Table A.12 (1) - Coding Standard

- “hisl_0021: Consistent vector indexing method” (Simulink)

Check MATLAB Code Analyzer messages

Check ID: mathworks.iec61508.himl_0004

Check MATLAB Functions for `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs.

Description

Verifies `%#codegen` directive, MATLAB Code Analyzer messages, and justification message IDs for:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| <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>. |

| Condition | Recommended Action |
|--|---|
| <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (3) - Defensive programming, Table A.4 (5) - Design and coding standards
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques, Table 1 (1e) - Use of established design principles, Table 1 (1f) - Use of unambiguous graphical representation, Table 1 (1g) - Use of style guides, Table 1 (1h) - Use of naming conventions
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming, Table A.12 (1) - Coding Standard, Table A.12 (2) - Coding Style Guide
- “Check Code for Errors and Warnings” (MATLAB)
- “himl_0004: MATLAB Code Analyzer recommendations for code generation” (Simulink)

Check MATLAB code for global variables

Check ID: mathworks.iec61508.himl_0005

Check for global variables in MATLAB code.

Description

Verifies that global variables are not used in any of the following:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Global variables are used in one or more of the following: <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- IEC 61508-3, Table A.3 (3) – Language subset
- IEC 62304, 5.5.3 - Software Unit acceptance criteria

- ISO 26262-6, Table 1 (1b) - Use of language subsets
- EN 50128, Table A.4 (11) - Language Subset
- “himl_0005: Usage of global variables in MATLAB functions” (Simulink)

Check usage of Math Operations blocks

Check ID: `mathworks.iec61508.MathOperationsBlocksUsage`

Identify usage of Math Operation blocks that might impact safety.

Description

This check inspects the usage of the following blocks:

- Abs
- Assignment
- Gain

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| <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 might contain Assignment blocks with incomplete array initialization that do not have block parameter Action if any output element is not assigned set to Error or Warning . | Set block parameter Action if any output element is not assigned to one of the recommended values: <ul style="list-style-type: none"> • Error, if Assignment block is not in an Iterator subsystem. • Warning, if Assignment block is in an Iterator subsystem. |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (3) - Defensive programming, Table A.3 (2) - Strongly typed programming language, Table B.8 (3) - Control Flow Analysis
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques, Table 9 (1f) - Control flow analysis
- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming, EN 50128, Table A.4 (8) - Strongly Typed Programming Language, Table A.19 (3) - Control Flow Analysis
- MISRA C:2012, Dir 4.1
- MISRA C:2012, Rule 9.1
- “hisl_0001: Usage of Abs block” (Simulink)
- “hisl_0029: Usage of Assignment blocks” (Simulink)

Check usage of Signal Routing blocks

Check ID: `mathworks.iec61508.SignalRoutingBlockUsage`

Identify usage of Signal Routing blocks that might impact safety.

Description

This check identifies model or subsystem Switch blocks that might generate code with inequality operations ($\sim=$) 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 ($\sim=$) 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. | 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

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) – Language subset, Table A.4 (3) – Defensive programming
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques

- EN 50128, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- MISRA C:2012, Dir 1.1

Check usage of Logic and Bit Operations blocks

Check ID: `mathworks.iec61508.LogicBlockUsage`

Identify usage of Logical Operator and Bit Operations blocks that might impact safety.

Description

This check inspects the usage of:

- Blocks that compute relational operators, including Relational Operator, Compare To Constant, Compare To Zero, and Detect Change blocks
- Logical Operator blocks

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The model or subsystem contains a block computing a relational operator that is operating on different data types. The condition can lead to unpredictable results in the generated code. | On the Block Parameters > Signal Attributes pane, set the Output data type to <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. |
| 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 <code>boolean</code>. |

| Condition | Recommended Action |
|-----------|--|
| | <ul style="list-style-type: none"> • In the Configuration Parameters dialog box, on the All Parameters pane, consider selecting the Implement logic signals as boolean data (vs. double). |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (2) – Strongly typed programming language, Table A.3 (3) – Language subset, Table A.4 (3) - Defensive programming
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1c) - Enforcement of strong typing, Table 1 (1b) - Use of language subsets
- EN 50128 - Table A.4 (8) - Strongly Typed Programming Language, Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming
- MISRA C:2012, Dir 1.1
- MISRA C:2012, Rule 10.1
- “hisl_0016: Usage of blocks that compute relational operators” (Simulink)
- “hisl_0017: Usage of blocks that compute relational operators (2)” (Simulink)
- “hisl_0018: Usage of Logical Operator block” (Simulink)

Check usage of Ports and Subsystems blocks

Check ID: `mathworks.iec61508.PortsSubsystemsUsage`

Identify usage of Ports and Subsystems blocks that might impact safety.

Description

This check inspects the usage of:

- For Iterator blocks
- While Iterator blocks
- If blocks
- Switch Case blocks

The check does not flag Switch Case blocks that do not use integer data types or enumeration values for inputs. To comply with “hisl_0011: Usage of Switch Case blocks and Action Subsystem blocks” (Simulink) – C, use an integer data type or an enumeration value for the inputs to 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. |

| Condition | Recommended Action |
|---|--|
| The model or subsystem contains a While Iterator block that has unlimited iterations. This condition can lead to infinite loops in the generated code. | For the identified While Iterator blocks: <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. |
| The model or subsystem contains an If block with an If expression or Elseif expressions that might cause floating-point equality or inequality comparisons in generated code. | Modify the expressions in the If block to avoid floating-point equality or inequality comparisons in generated code. |
| The model or subsystem contains an If block using Elseif expressions without an Else condition. | In the If block Block Parameters dialog box, select Show else condition . Connect the resulting Else output port to an If Action Subsystem block. |
| The model or subsystem contains an If block with output ports that do not connect to If Action Subsystem blocks. | Verify that output ports of the If block connect to If Action Subsystem blocks. |
| The model or subsystem contains an Switch Case block without a default case. | In the Switch Case block Block Parameters dialog box, select Show default case . Connect the resulting default output port to a Switch Case Action Subsystem block. |
| The model or subsystem contains a Switch Case block with an output port that does not connect to a Switch Case Action Subsystem block. | Verify that output ports of the Switch Case blocks connect to Switch Case Action Subsystem blocks. |

| Condition | Recommended Action |
|---|--|
| <p>The model or subsystem contains one of the following time-dependent blocks in a For Iterator or While Iterator subsystem:</p> <ul style="list-style-type: none"> • Discrete Filter • Discrete FIR Filter • Discrete State-Space • Discrete Transfer Fcn • Discrete Zero-Pole • Transfer Fcn First Order • Transfer Fcn Lead or Lag • Transfer Fcn Real Zero • Discrete Derivative • Discrete Transfer Fcn (with initial outputs) • Discrete Transfer Fcn (with initial states) • Discrete Zero-Pole (with initial outputs) • Discrete Zero-Pole (with initial states) | <p>In the model or subsystem, consider removing the time-dependent blocks.</p> |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- IEC 61508-3, Table A.3 (3) - Language subset, Table A.4 (3) - Defensive programming
- IEC 62304, 5.5.3 - Software Unit acceptance criteria
- ISO 26262-6, Table 1 (1b) - Use of language subsets, Table 1 (1d) - Use of defensive implementation techniques
- EN 50128 - Table A.4 (11) - Language Subset, Table A.3 (1) - Defensive Programming

- MISRA C:2012, Rule 14.2
- MISRA C:2012, Rule 16.4
- MISRA C:2012, Dir 4.1
- “hisl_0006: Usage of While Iterator blocks” (Simulink)
- “hisl_0007: Usage of While Iterator subsystems” (Simulink)
- “hisl_0008: Usage of For Iterator Blocks” (Simulink)
- “hisl_0009: Usage of For Iterator Subsystem blocks” (Simulink)
- “hisl_0011: Usage of Switch Case blocks and Action Subsystem blocks” (Simulink)

Display configuration management data

Check ID: `mathworks.iec61508.MdlVersionInfo`

Display model configuration and checksum information.

Description

This informer check displays the following information for the current model:

- Model version number
- Model author
- Date
- Model checksum

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Could not retrieve model version and checksum information. | This summary is provided for your information. No action is required. |

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- IEC 61508-3, Table A.8 (5) – Software configuration management
- IEC 62304-8 – Software configuration management process
- ISO 26262-8, Clause 7 – Configuration management
- EN 50128, Table A.9 (5) – Software Configuration Management
- “How Simulink Helps You Manage Model Versions” (Simulink) in the Simulink documentation
- Model Change Log (Simulink Report Generator) in the Simulink Report Generator documentation

- `Simulink.BlockDiagram.getChecksum` (Simulink) in the Simulink documentation
- `Simulink.SubSystem.getChecksum` (Simulink) in the Simulink documentation

MathWorks Automotive Advisory Board Checks

In this section...

- “MathWorks Automotive Advisory Board Checks” on page 3-138
- “Check font formatting” on page 3-139
- “Check transition orientations in flow charts” on page 3-141
- “Check for nondefault block attributes” on page 3-143
- “Check signal line labels” on page 3-145
- “Check for propagated signal labels” on page 3-147
- “Check default transition placement in Stateflow charts” on page 3-149
- “Check return value assignments of graphical functions in Stateflow charts” on page 3-151
- “Check entry formatting in State blocks in Stateflow charts” on page 3-152
- “Check usage of return values from a graphical function in Stateflow charts” on page 3-153
- “Check for pointers in Stateflow charts” on page 3-154
- “Check for event broadcasts in Stateflow charts” on page 3-155
- “Check transition actions in Stateflow charts” on page 3-156
- “Check for MATLAB expressions in Stateflow charts” on page 3-157
- “Check for indexing in blocks” on page 3-158
- “Check file names” on page 3-160
- “Check folder names” on page 3-162
- “Check for prohibited blocks in discrete controllers” on page 3-163
- “Check for prohibited sink blocks” on page 3-165
- “Check positioning and configuration of ports” on page 3-167
- “Check for matching port and signal names” on page 3-169
- “Check whether block names appear below blocks” on page 3-170
- “Check for mixing basic blocks and subsystems” on page 3-171
- “Check for unconnected ports and signal lines” on page 3-173
- “Check position of Trigger and Enable blocks” on page 3-174
- “Check usage of tunable parameters in blocks” on page 3-175

In this section...

- “Check Stateflow data objects with local scope” on page 3-177
- “Check for Strong Data Typing with Simulink I/O” on page 3-178
- “Check usage of exclusive and default states in state machines” on page 3-179
- “Check Implement logic signals as Boolean data (vs. double)” on page 3-181
- “Check model diagnostic parameters” on page 3-182
- “Check the display attributes of block names” on page 3-185
- “Check display for port blocks” on page 3-187
- “Check subsystem names” on page 3-188
- “Check port block names” on page 3-190
- “Check character usage in signal labels” on page 3-192
- “Check character usage in block names” on page 3-194
- “Check Trigger and Enable block names” on page 3-196
- “Check for Simulink diagrams using nonstandard display attributes” on page 3-197
- “Check MATLAB code for global variables” on page 3-199
- “Check visibility of block port names” on page 3-201
- “Check orientation of Subsystem blocks” on page 3-203
- “Check usage of Relational Operator blocks” on page 3-204
- “Check usage of Switch blocks” on page 3-205
- “Check usage of buses and Mux blocks” on page 3-206
- “Check for bitwise operations in Stateflow charts” on page 3-207
- “Check for comparison operations in Stateflow charts” on page 3-209
- “Check for unary minus operations on unsigned integers in Stateflow charts” on page 3-210
- “Check for equality operations between floating-point expressions in Stateflow charts” on page 3-211
- “Check input and output settings of MATLAB Functions” on page 3-212
- “Check MATLAB Function metrics” on page 3-214
- “Check for mismatches between names of Stateflow ports and associated signals” on page 3-216

In this section...

“Check scope of From and Goto blocks” on page 3-217

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” (Simulink)
- “Simulink Checks” (Simulink)
- “Simulink Coder Checks” (Simulink Coder)
- “MAAB Control Algorithm Modeling” (Simulink) guidelines
- The MathWorks Automotive Advisory Board on the MathWorks website, which lists downloads for the latest version of *Control Algorithm Modeling Guidelines Using MATLAB, Simulink, and Stateflow*

Check font formatting

Check ID: mathworks.maab.db_0043

Check for difference in font and font sizes.

Description

With the exception of free text annotations within a model, text elements, such as block names, block annotations, and signal labels, must have the same font style and font size. Select a font style and font size that is legible and portable (convertible between platforms), such as Arial or Times New Roman 12 point. To specify font rules for a Simulink session, from the Simulink editor select **Diagram > Format > Font Styles for Model**.

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 in the right pane of the Model |

| Condition | Recommended Action |
|-----------|---|
| | Advisor, click Modify all Fonts , or manually change the fonts and font sizes of text elements in the model so they are consistent and portable. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Action Results

In the right pane of the Model Advisor, clicking **Modify all Fonts** changes the font and font size of all text elements in the model according to the values you specify in the input parameters.

For the input parameters, if you specify **Common**, clicking **Modify all Fonts** changes the font and font sizes of all text elements in the model to the most commonly used fonts, font sizes, or font styles.

See Also

- MAAB guideline, Version 3.0: db_0043: Simulink font and font size (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0043: Simulink font and font size.

Check transition orientations in flow charts

Check ID: mathworks.maab.db_0132

Check transition orientations in flow charts.

Description

The following rules apply to transitions in flow charts:

- Draw transition conditions horizontally.
- Draw transitions with a condition action vertically.
- Junctions in flow charts should have a default exit transition.
- Transitions in flow charts should not combine condition and action.

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. |
| Junction does not have a default exit transition | Add a default exit transition to the junction. |
| Transition has condition and action | Split up condition and action into separate transitions |

Capabilities and Limitations

- MAAB guideline, Version 3.0 limitation: Although db_0132: Transitions in flow charts (Simulink) has an exception for loop constructs, the check does flag flow charts containing loop constructs if the transition violates the orientation rule.
- JMAAB guideline, Version 4.0 limitation: The check only flags flow charts containing loop constructs if the transition violates the orientation rule.
- Runs on library models.
- Does not analyze content of library linked blocks.

- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0132: Transitions in flow charts (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0132: Transitions in Flow Charts.

Check for nondefault block attributes

Check ID: `mathworks.maab.db_0140`

Identify blocks that use nondefault block parameter values that are not displayed in the model diagram.

Description

Model diagrams should display block parameters that have values other than default values. One way of displaying this information is by using the **Block Annotation** tab in the Block Properties dialog box. To automatically fix warnings associated with this check, see “Automatically Fix Display of Nondefault Block Parameters”.

To customize the list of nondefault block parameters that are flagged by the check, see “Customize Model Advisor Check for Nondefault Block Attributes”.

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 box, use the Block Annotation tab to add block parameter annotations. |

Capabilities and Limitations

- Only customizable for block parameters in `IntrinsicDialogParameters`. See “Common Block Properties” (Simulink)
- JMAAB guideline, Version 4.0 limitation: The check flags masked blocks that display parameter information but do not use block annotations. JMAAB 4.0 guidelines allow masked blocks to display parameter information.
- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialog boxes.
- Allows exclusions of blocks and charts.

Tip

If you use the `add_block` function with `'built-in/blocktype'` as a source block path name for Simulink built-in blocks, some default parameter values of some blocks are different from the defaults that you get if you added those blocks interactively by using Simulink.

See Also

- MAAB guideline, Version 3.0: db_0140: Display of basic block parameters (Simulink).
- JMAAB guideline, Version 4.0: db_0140: Display of block parameters.
- For a list of block parameter default values, see “Block-Specific Parameters” (Simulink).
- `add_block`.

Check signal line labels

Check ID: mathworks.maab.na_0008

Check the labeling on signal lines.

Description

Use a label to identify:

- Signals originating from the following blocks (the block icon exception noted below applies to all blocks listed, except Inport, Bus Selector, Demux, and Selector):
 - Bus Selector block (tool forces labeling)
 - Chart block (Stateflow)
 - Constant block
 - Data Store Read block
 - Demux block
 - From block
 - Inport block
 - Selector block
 - Subsystem block

Block Icon Exception If a signal label is visible in the display of the icon for the originating block, you do not have to display a label for the connected signal unless the signal label is required elsewhere due to a rule for signal destinations.

- Signals connected to one of the following destination blocks (directly or indirectly with a basic block that performs an operation that is not transformative):
 - Bus Creator block
 - Chart block (Stateflow)
 - Data Store Write block
 - Goto block
 - Mux block
 - Outport block
 - Subsystem block
- Any signal of interest.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---------------------------|
| Signals coming from Bus Selector, Chart, Constant, Data Store Read, Demux, From, Inport, or Selector blocks are not labeled. | Label the signal. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: na_0008: Display of labels on signals (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0008: Display of labels on signals.
- “Signal Names and Labels” (Simulink) in the Simulink documentation.

Check for propagated signal labels

Check ID: mathworks.maab.na_0009

Check for propagated labels on signal lines.

Description

You should propagate a signal label from its source rather than enter the signal label explicitly (manually) if the signal originates from:

- An Inport block in a nested subsystem. However, if the nested subsystem is a library subsystem, you can explicitly label the signal coming from the Inport block to accommodate reuse of the library block.
- A basic block that performs a nontransformative operation.
- A Subsystem or Stateflow Chart block. However, if the connection originates from the output of an instance of the library block, you can explicitly label the signal to accommodate reuse of the library block.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model includes signal labels that were entered explicitly, but should be propagated. | Use the open angle bracket (<) character to mark signal labels that should be propagated and remove the labels that were entered explicitly. |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: na_0009: Entry versus propagation of signal labels (Simulink) in the Simulink documentation.

- JMAAB guideline, Version 4.0: na_0009: Entry versus propagation of signal labels.
- “Signal Names and Labels” (Simulink) in the Simulink documentation.

Check default transition placement in Stateflow charts

Check ID: mathworks.maab.jc_0531

Check default transition placement in Stateflow charts.

Description

In a Stateflow chart, you should connect the default transition at the top of the state and place the destination state of the default transition above other states in the hierarchy. There should be only one default transition.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| There is no default transition. | Add a default transition. |
| The default transition for a Stateflow chart is not connected at the top of the state. | Move the default transition to the top of the Stateflow chart. |
| The destination state of a Stateflow chart default transition is lower than other states in the same hierarchy. | Adjust the position of the default transition destination state so that the state is above other states in the same hierarchy. |
| There is more than one default transition. | Multiple default transitions should be combined into one default transition by using junctions and conditions. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0531: Placement of the default transition (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0531: Placement of the default transition.

- “Syntax for States and Transitions” (Stateflow)

Check return value assignments of graphical functions in Stateflow charts

Check ID: mathworks.maab.jc_0511

Identify graphical functions with multiple assignments of return values in Stateflow charts.

Description

The return value from a Stateflow graphical function must be set in only one place.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The return value from a Stateflow graphical function is assigned in multiple places. | Modify the specified graphical function so that its return value is set in one place. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0511: Setting the return value from a graphical function (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0511: Setting the return value from a graphical function.
- “When to Use Reusable Functions in Charts” (Stateflow) in the Stateflow documentation.

Check entry formatting in State blocks in Stateflow charts

Check ID: `mathworks.maab.jc_0501`

Identify missing line breaks between entry action (`en`), during action (`du`), and exit action (`ex`) entries in states. Identify missing line breaks after semicolons (`;`) in statements.

Description

Start a new line after the `entry`, `during`, and `exit` entries, and after the completion of a statement `;`.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| An entry (<code>en</code>) is not on a new line. | Add a new line after the <code>entry</code> . |
| A during (<code>du</code>) is not on a new line. | Add a new line after the <code>during</code> . |
| An exit (<code>ex</code>) is not on a new line. | Add a new line after the <code>exit</code> . |
| Multiple statements found on one line. | Add a new line after each statement. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: `jc_0501`: Format of entries in a State block (Simulink) in the Simulink documentation.

Check usage of return values from a graphical function in Stateflow charts

Check ID: `mathworks.maab.jc_0521`

Identify calls to graphical functions in conditional expressions.

Description

Do not use the return value of a graphical function in a comparison operation.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Conditional expressions contain calls to graphical functions. | Assign return values of graphical functions to intermediate variables. Use these intermediate variables in the specified conditional expressions. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `jc_0521`: Use of the return value from graphical functions (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `jc_0521`: Use of the return value from graphical functions.
- “When to Use Reusable Functions in Charts” (Stateflow) in the Stateflow documentation.
- “Reuse Logic Patterns Using Graphical Functions” (Stateflow) in the Stateflow documentation.

Check for pointers in Stateflow charts

Check ID: `mathworks.maab.jm_0011`

Identify pointer operations on custom code variables.

Description

Pointers to custom code variables are not allowed.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Custom code variables use pointer operations. | Modify the specified chart to remove the dependency on pointer operations. |

Capabilities and Limitations

- Applies only to Stateflow charts that use C as the action language.
- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `jm_0011`: Pointers in Stateflow (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `jm_0011`: Pointers in Stateflow.

Check for event broadcasts in Stateflow charts

Check ID: mathworks.maab.jm_0012

Identify undirected event broadcasts that might cause recursion during simulation and generate inefficient code.

Description

Event broadcasts in Stateflow charts must be directed.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|----------------------------------|---|
| Event broadcasts are undirected. | Rearchitect the diagram to use directed event broadcasting. Use the send syntax or qualified event names to direct the event to a particular state. Use multiple send statements to direct an event to more than one state. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jm_0012: Event broadcasts (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jm_0012: Event broadcasts.
- “Broadcast Events to Synchronize States” (Stateflow) in the Stateflow documentation.

Check transition actions in Stateflow charts

Check ID: `mathworks.maab.db_0151`

Identify missing line breaks between transition actions.

Description

For readability, start each transition action on a new line.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Multiple transition actions are on a single line. | Verify that each transition action begins on a new line. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `db_0151`: State machine patterns for transition actions (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `db_0151`: State machine patterns for transition actions.
- “Syntax for States and Transitions” (Stateflow)

Check for MATLAB expressions in Stateflow charts

Check ID: mathworks.maab.db_0127

Identify Stateflow objects that use MATLAB expressions that are not suitable for code generation.

Description

Do not use MATLAB functions, instructions, and operators in Stateflow objects.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Stateflow objects use MATLAB expressions. | Replace MATLAB expressions in Stateflow objects. |

Capabilities and Limitations

- Applies only to Stateflow charts that use C as the action language.
- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0127: MATLAB commands in Stateflow (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0127: MATLAB commands in Stateflow.
- “Access Built-In MATLAB Functions and Workspace Data” (Stateflow) in the Stateflow documentation.

Check for indexing in blocks

Check ID: `mathworks.maab.db_0112`

Check that blocks use consistent vector indexing.

Description

Check that blocks use consistent vector indexing. When possible, use zero-based indexing to improve code efficiency.

Available with Simulink Verification and Validation.

The check verifies consistent indexing for the following objects:

| Object | Indexing |
|---|--|
| <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

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0112: Indexing (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0112: Indexing.

Check file names

Check ID: `mathworks.maab.ar_0001`

Checks the names of all files residing in the same folder as the model

Description

A file name conforms to constraints.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The file name contains illegal characters. | Rename the file. Allowed characters are a–z, A–Z, 0–9, and underscore (_). |
| The file name starts with a number. | Rename the file. |
| The file name starts with an underscore ("_"). | Rename the file. |
| The file name ends with an underscore ("_"). | Rename the file. |
| The file extension contains one (or more) underscores. | Change the file extension. |
| The file name has consecutive underscores. | Rename the file. |
| The file name contains more than one dot ("."). | Rename the file. |

Capabilities and Limitations

- MAAB guideline, Version 3.0 limitation: The check does not flag conflicts with C++ keywords.
- Runs on library models.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: `ar_0001`: Filenames (Simulink) in the Simulink documentation.

- JMAAB guideline, Version 4.0: ar_0001: Usable characters for filenames.

Check folder names

Check ID: `mathworks.maab.ar_0002`

Checks model directory and subdirectory names for invalid characters.

Description

A directory name conforms to constraints.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The directory name contains illegal characters. | Rename the directory. Allowed characters are a–z, A–Z, 0–9, and underscore (_). |
| The directory name starts with a number. | Rename the directory. |
| The directory name starts with an underscore ("_"). | Rename the directory. |
| The directory name ends with an underscore ("_"). | Rename the directory. |
| The directory name has consecutive underscores. | Rename the directory. |

Capabilities and Limitations

- Runs on library models.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: `ar_0002`: Directory names (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `ar_0002`: Usable characters for folder names.

Check for prohibited blocks in discrete controllers

Check ID: mathworks.maab.jm_0001

Check for prohibited blocks in discrete controllers.

Description

The check identifies continuous blocks in discrete controller models.

Available with Simulink Verification and Validation.

Input Parameters

To change the list of blocks that the check flags, you can use the Model Advisor Configuration Editor.

- 1 Open the Model Configuration Editor and navigate to **Check for prohibited blocks in discrete controllers**.
- 2 In the **Input Parameters** pane, to:
 - Prohibit the blocks as specified in MAAB 3.0, from **Standard**, select **MAAB 3.0**. The **Block type list** table provides the blocks that MAAB 3.0 prohibits inside controllers.
 - To specify blocks to either allow or prohibit, from **Standard**, select **Custom**. In **Treat blocktype list as**, select **Allowed** or **Prohibited**. In the **Block type list** table, you can add or remove blocks.
- 3 Click **Apply**.
- 4 Save the configuration. When you run the check using this configuration, the check uses the specified input parameters.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Continuous blocks — Derivative, Integrator, State-Space, Transfer Fcn, Transfer Delay, Variable Time Delay, Variable Transport Delay, and Zero-Pole — are not permitted in models representing discrete controllers. | Replace continuous blocks with the equivalent blocks discretized in the s-domain. Use the Discretizing library, as described in “Discretize Blocks from the Simulink Model” (Simulink) in the Simulink documentation. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jm_0001: Prohibited Simulink standard blocks inside controllers (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jm_0001: Prohibited Simulink standard blocks inside controllers.
- “Overview of the Model Advisor Configuration Editor”

Check for prohibited sink blocks

Check ID: mathworks.maab.hd_0001

Check for prohibited Simulink sink blocks.

Description

You must design controller models from discrete blocks. Sink blocks, such as the Scope block, are not allowed in controller models.

Available with Simulink Verification and Validation.

Input Parameters

To change the list of blocks that the check flags, you can use the Model Advisor Configuration Editor.

- 1 Open the Model Configuration Editor and navigate to **Check for prohibited sink blocks**.
- 2 In the **Input Parameters** pane, to:
 - Prohibit the blocks as specified by MAAB 3.0, from **Standard**, select **MAAB 3.0**. The **Block type list** table provides the sink blocks that MAAB 3.0 prohibits.
 - To specify blocks to either allow or prohibit, from **Standard**, select **Custom**. In **Treat blocktype list as**, select **Allowed** or **Prohibited**. In the **Block type list** table, you can add or remove blocks.
- 3 Click **Apply**.
- 4 Save the configuration. When you run the check using this configuration, the check uses the specified input parameters.

Results and Recommended Actions

| Condition | Recommended Action |
|--|------------------------------------|
| Sink blocks are not permitted in discrete controllers. | Remove sink blocks from the model. |

Capabilities and Limitations

- Runs on library models.

- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: hd_0001: Prohibited Simulink sinks (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: hd_0001: Prohibited Simulink sinks.
- “Overview of the Model Advisor Configuration Editor”

Check positioning and configuration of ports

Check ID: mathworks.maab.db_0042

Check whether the model contains ports with invalid position and configuration.

Description

In models, ports must comply with the following rules:

- Place Inport blocks on the left side of the diagram. It is acceptable to move the Inport block to the right only to prevent signal crossings.
- Place Outport blocks on the right side of the diagram. It is acceptable to move the Outport block to the 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 left-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

- Runs on library models.

- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.
- Does not analyze signal crossings

See Also

- MAAB guideline, Version 3.0: db_0042: Port block in Simulink models (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0042: Port block in Simulink models.

Check for matching port and signal names

Check ID: mathworks.maab.jm_0010

Check for mismatches between names of ports and corresponding signals.

Description

Use matching names for ports and their corresponding signals.

Available with Simulink Verification and Validation.

Prerequisite

Prerequisite MAAB guidelines, Version 3.0, for this check are:

- db_0042: Port block in Simulink models (Simulink)
- na_0005: Port block name visibility in Simulink models (Simulink)

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Ports have names that differ from their corresponding signals. | Change the port name or the signal name to match the name for the signal. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jm_0010: Port block names in Simulink models (Simulink) in the Simulink documentation.

Check whether block names appear below blocks

Check ID: `mathworks.maab.db_0142`

Check whether block names appear below blocks.

Description

If shown, the name of the block should appear below the block.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Blocks have names that do not appear below the blocks. | Set the name of the block to appear below the blocks. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `db_0142`: Position of block names (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `db_0142`: Position of block names.

Check for mixing basic blocks and subsystems

Check ID: mathworks.maab.db_0143

Check for systems that mix primitive blocks and subsystems.

Description

You must design each level of a model with building blocks of the same type, for example, only subsystems or only primitive (basic) blocks. If you mask your subsystem and set `MaskType` to a nonempty string, the Model Advisor treats the subsystem as a basic block.

Available with Simulink Verification and Validation.

Input Parameters

To change the list of blocks that the check flags, you can use the Model Advisor Configuration Editor.

- 1 Open the Model Configuration Editor and navigate to **Check for mixing basic blocks and subsystems**.
- 2 In the **Input Parameters** pane, to:
 - Allow the blocks specified by MAAB 3.0, from **Standard**, select **MAAB 3.0**. The **Block type list** table provides the blocks that MAAB 3.0 allows at any model level.
 - To specify blocks to either allow or prohibit, from **Standard**, select **Custom**. In **Treat blocktype list as**, select **Allowed** or **Prohibited**. In the **Block type list** table, you can add or remove blocks.
- 3 Click **Apply**.
- 4 Save the configuration. When you run the check using this configuration, the check uses the specified input parameters.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| A level in the model includes subsystem blocks and primitive blocks. | Move nonvirtual blocks into the subsystem. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0143: Similar block types on the model levels (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0143: Similar block types on the model levels.
- “Overview of the Model Advisor Configuration Editor”

Check for unconnected ports and signal lines

Check ID: mathworks.maab.db_0081

Check whether model has unconnected input ports, output ports, or signal lines.

Description

Unconnected inputs should be connected to ground blocks. Unconnected outputs should be connected to terminator blocks.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Blocks have unconnected inputs or outputs. | Connect unconnected lines to blocks specified by the design or to Ground or Terminator blocks. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: db_0081: Unconnected signals, block inputs and block outputs (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0081: Unconnected signals, block inputs and block outputs.

Check position of Trigger and Enable blocks

Check ID: `mathworks.maab.db_0146`

Check the position of Trigger and Enable blocks.

Description

Locate blocks that define subsystems as conditional or iterative at the top of the subsystem diagram.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Trigger, Enable, and Action Port blocks are not at the top of the subsystem diagram. | Move the Trigger, Enable, and Action Port blocks to the top of the subsystem diagram. |

Capabilities and Limitations

- JMAAB guideline, Version 4.0 limitation: The check does not verify that For Each or For Iterator blocks are uniformly located.
- Runs on library models.
- Analyzes content of library linked blocks.
- Does not analyze content in masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `db_0146`: Triggered, enabled, conditional Subsystems (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `db_0146`: Triggered, enabled, conditional Subsystems.

Check usage of tunable parameters in blocks

Check ID: `mathworks.maab.db_0110`

Check whether tunable parameters specify expressions, data type conversions, or indexing operations.

Description

To make a parameter tunable, you must enter the basic block without the use of MATLAB calculations or scripting. For example, omit:

- Expressions
- Data type conversions
- Selections of rows or columns

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Blocks have a tunable parameter that specifies an expression, data type conversion, or indexing operation. | In each case, move the calculation outside of the block, for example, by performing the calculation with a series of Simulink blocks, or precompute the value as a new variable. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not evaluate mask parameters.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `db_0110`: Tunable parameters in basic blocks (Simulink) in the Simulink documentation.

- JMAAB guideline, Version 4.0: db_0110: Tunable parameters in basic blocks.

Check Stateflow data objects with local scope

Check ID: mathworks.maab.db_0125

Check whether Stateflow data objects with local scope are defined at the chart level or below.

Description

You must define local data of a Stateflow block on the chart level or below in the object hierarchy. You cannot define local variables on the machine level; however, parameters and constants are allowed at the machine level.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Local data is not defined in the Stateflow hierarchy at the chart level or below. | Define local data at the chart level or below. |

Capabilities and Limitations

- JMAAB guideline, Version 4.0 limitation: The check does not detect if local data has the same name within charts or states that have parent-child relationships.
- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: db_0125: Scope of internal signals and local auxiliary variables (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: db_0125: Scope of internal signals and local auxiliary variables.

Check for Strong Data Typing with Simulink I/O

Check ID: `mathworks.maab.db_0122`

Check whether labeled Stateflow and Simulink input and output signals are strongly typed.

Description

Strong data typing between Stateflow and Simulink input and output signals is required.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| A Stateflow chart does not use strong data typing with Simulink. | Select the Use Strong Data Typing with Simulink I/O check box for the specified block. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `db_0122`: Stateflow and Simulink interface signals and parameters (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `db_0122`: Stateflow and Simulink interface signals and parameters.
- “Syntax for States and Transitions” (Stateflow)

Check usage of exclusive and default states in state machines

Check ID: mathworks.maab.db_0137

Check states in state machines.

Description

In state machines:

- There must be at least two exclusive states.
- A state cannot have only one substate.
- The initial state of a hierarchical level with exclusive states is clearly defined by a default transition.

Available with Simulink Verification and Validation.

Prerequisite

A prerequisite MAAB guideline, Version 3.0, for this check is db_0149: Flow chart patterns for condition actions (Simulink).

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| A system is underspecified. | Validate that the intended design is represented in the Stateflow diagram. |
| Chart has only one exclusive (OR) state. | Make the state a parallel state, or add another exclusive (OR) state. |
| Chart does not have a default state defined. | Define a default state. |
| Chart has multiple default states defined. | Define only one default state. Make the others nondefault. |
| State has only one exclusive (OR) substate. | Make the state a parallel state, add another exclusive (OR) state, or replace the state with a flow chart. |
| State does not have a default substate defined. | Define a default substate. |
| State has multiple default substates defined. | Define only one default substate, make the others nondefault. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: db_0137: States in state machines (Simulink) in the Simulink documentation.

Check Implement logic signals as Boolean data (vs. double)

Check ID: mathworks.maab.jc_0011

Check the optimization parameter for Boolean data types.

Description

Optimization for Boolean data types is required

Available with Simulink Verification and Validation.

Prerequisite

A prerequisite MAAB guideline, Version 3.0, for this check is na_0002: Appropriate implementation of fundamental logical and numerical operations (Simulink).

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Configuration setting for Implement logic signals as boolean data (vs. double) is not set. | Select the Implement logic signals as boolean data (vs. double) check box in the Configuration Parameters dialog box All Parameters pane. |

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: jc_0011: Optimization parameters for Boolean data types (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0011: Optimization parameters for Boolean data types.

Check model diagnostic parameters

Check ID: `mathworks.maab.jc_0021`

Check the model diagnostics configuration parameter settings.

Description

You should enable the following diagnostics:

- Algebraic loop**
- Minimize algebraic loop**
- Inf or NaN block output**
- Duplicate data store names**
- Unconnected block input ports**
- Unconnected block output ports**
- Unconnected line**
- Unspecified bus object at root Output block**
- Element name mismatch**
- Invalid function-call connection**

Diagnostics not listed in the Results and Recommended Actions section below can be set to any value.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Algebraic loop is set to none. | Set Algebraic loop on the Diagnostics > Solver pane in the Configuration Parameters dialog box to error or warning . Otherwise, Simulink might attempt to automatically break the algebraic loops, which can impact the execution order of the blocks. |
| Minimize algebraic loop is set to none. | Set Minimize algebraic loop on the Diagnostics > Solver pane in the Configuration Parameters dialog box to error or warning . Otherwise, Simulink might attempt to automatically break the algebraic loops for |

| Condition | Recommended Action |
|--|---|
| | 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 in the Configuration Parameters dialog box to error or warning . |
| Duplicate data store names is set to none , which can result in nonunique variable naming in the generated code. | Set Duplicate data store names on the Diagnostics > Data Validity > Signals pane in the Configuration Parameters dialog box to error or warning . |
| Unconnected block input ports is set to none , which prevents code generation. | Set Unconnected block input ports on the Diagnostics > Data Validity > Signals pane in the Configuration Parameters dialog box to error or warning . |
| Unconnected block output ports is set to none , which can lead to dead code. | Set Unconnected block output ports on the Diagnostics > Data Validity > Signals pane in the Configuration Parameters dialog box to error or warning . |
| Unconnected line is set to none , which prevents code generation. | Set Unconnected line on the Diagnostics > Connectivity > Signals pane in the Configuration Parameters dialog box to error or warning . |
| Unspecified bus object at root Output block is set to none , which can lead to an unspecified interface if the model is referenced from another model. | Set Unspecified bus object at root Output block on the Diagnostics > Connectivity > Buses pane in the Configuration Parameters dialog box to error or warning . |
| Element name mismatch is set to none , which can lead to an unintended interface in the generated code. | Set Element name mismatch on the Diagnostics > Connectivity > Buses pane in the Configuration Parameters dialog box to error or warning . |

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: jc_0021: Model diagnostic settings (Simulink) in the Simulink documentation.

Check the display attributes of block names

Check ID: mathworks.maab.jc_0061

Check the display attributes of subsystem and block names.

Description

When the subsystem and block names provide descriptive information, display the names. If the block function is known from its appearance, do not display the name. Blocks with names that are obvious from the block appearance:

- From
- Goto
- Ground
- Logic
- MinMax
- ModelReference
- MultiPortSwitch
- Product
- Relational Operator
- Saturate
- Switch
- Terminator
- Trigonometry
- Unit Delay
- Sum
- Compare To Constant
- Compare To Zero

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Name is displayed and obvious from the block appearance. | Hide name by clearing Diagram > Format > Show Block Name. |

| Condition | Recommended Action |
|--|---|
| <p>Name is not descriptive. Specifically, the block name is:</p> <ul style="list-style-type: none"> • Not obvious from the block appearance. • The default name appended with an integer. | <p>Modify the name to be more descriptive or hide the name by clearing Diagram > Format > Show Block Name.</p> |
| <p>Name is descriptive and not displayed. Descriptive names are:</p> <ul style="list-style-type: none"> • Provided for blocks that are not obvious from the block appearance. • Not a default name appended with an integer. | <p>Display the name by selecting Diagram > Format > Show Block Name</p> |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0061: Display of block names (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0061: Display of block names.

Check display for port blocks

Check ID: mathworks.maab.jc_0081

Check the **Icon display** setting for Inport and Outport blocks.

Description

The **Icon display** setting is required.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The Icon display setting is not set. | Set the Icon display to Port number for the specified Inport and Outport blocks. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: jc_0081: Icon display for Port block (Simulink) in the Simulink documentation.

Check subsystem names

Check ID: `mathworks.maab.jc_0201`

Check whether subsystem block names include invalid characters.

Description

The names of all subsystem blocks that generate code are checked for invalid characters.

The check does not report invalid characters in subsystem names for:

- Virtual subsystems
- Atomic subsystems with **Function Packaging** set to **Inline**

Available with Simulink Verification and Validation.

Input Parameters

To control the naming convention for blocks that the check flags, you can use the Model Advisor Configuration Editor.

- 1 Open the Model Configuration Editor and navigate to **Check port block names**. In the **Input Parameter** pane:

- Use **Naming standard** to select **MAAB 3.0** or **Custom**. When you select **MAAB 3.0**, the check uses the regular expression `([a-zA-Z_0-9])|(^d)|(^)|(^_)|(^_)$` to verify that names:
 - Use these characters: **a-z**, **A-Z**, **0-9**, and the underscore (**_**).
 - Do not start with a number.
 - Do not use underscores at the beginning or end of a string.
 - Do not use more than one consecutive underscore.

When you select **Custom**, you can enter your own **Regular expression for prohibited names**. For example, if you want to allow more than one consecutive underscore, enter `([a-zA-Z_0-9])|(^d)|(^)|(^_)|(^_)$`.

- 2 Click **Apply**.
- 3 Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The subsystem names do not comply with the naming standard specified in the input parameters. | Update the subsystem names to comply with your own guidelines or the MAAB guidelines. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Tips

Use underscores to separate parts of a subsystem name instead of spaces.

See Also

- MAAB guideline, Version 3.0: jc_0201: Usable characters for Subsystem names (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0201: Usable characters for Subsystem names.

Check port block names

Check ID: `mathworks.maab.jc_0211`

Check whether Inport and Outport block names include invalid characters.

Description

The names of all Inport and Outport blocks are checked for invalid characters.

Available with Simulink Verification and Validation.

Input Parameters

To control the naming convention for blocks that the check flags, you can use the Model Advisor Configuration Editor.

- 1 Open the Model Configuration Editor and navigate to **Check port block names**. In the **Input Parameter** pane:
 - Use **Naming standard** to select **MAAB 3.0** or **Custom**. When you select **MAAB 3.0**, the check uses the regular expression `([^a-zA-Z_0-9])|(^\d)|(^)|(_)|(^_)|(_$)` to verify that names:
 - Use these characters: **a-z**, **A-Z**, **0-9**, and the underscore (**_**).
 - Do not start with a number.
 - Do not use underscores at the beginning or end of a string.
 - Do not use more than one consecutive underscore.

When you select **Custom**, you can enter your own **Regular expression for prohibited names**. For example, if you want to allow more than one consecutive underscore, enter `([^a-zA-Z_0-9])|(^\d)|(^)|(^_)|(_$)`.

- 2 Click **Apply**.
- 3 Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The block names do not comply with the naming standard specified in the input parameters. | Update the block names to comply with your own guidelines or the MAAB guidelines. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Tips

Use underscores to separate parts of a block name instead of spaces.

See Also

- MAAB guideline, Version 3.0: jc_0211: Usable characters for Inport blocks and Outport blocks (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0211: Usable characters for Inport block and Outport block.

Check character usage in signal labels

Check ID: `mathworks.maab.jc_0221`

Check whether signal line names include invalid characters.

Description

The names of all signal lines are checked for invalid characters.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The signal line name contains illegal characters. | Rename the signal line. Allowed characters include a–z, A–Z, 0–9, and underscore (_). |
| The signal line name starts with a number. | Rename the signal line. |
| The signal line name starts with an underscore ("_"). | Rename the signal line. |
| The signal line name ends with an underscore ("_"). | Rename the signal line. |
| The signal line name has consecutive underscores. | Rename the signal line. |
| The signal line name has blank spaces. | Rename the signal line. |
| The signal line name has control characters. | Rename the signal line. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Does not allow exclusions of blocks or charts.

Tips

Use underscores to separate parts of a signal line name instead of spaces.

See Also

- MAAB guideline, Version 3.0: jc_0221: Usable characters for signal line names (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0222: Usable characters for signal line and bus names.

Check character usage in block names

Check ID: `mathworks.maab.jc_0231`

Check whether block names include invalid characters.

Description

The check reports invalid characters in all block names, except:

- Inports and Outports
- Unmasked subsystems

MAAB guideline, Version 3.0, `jc_0231`: Usable characters for block names (Simulink) does not apply to subsystem blocks.

Available with Simulink Verification and Validation.

Prerequisite

A prerequisite MAAB guideline, Version 3.0, for this check is `jc_0201`: Usable characters for Subsystem names (Simulink).

Input Parameters

To control the naming convention for blocks that the check flags, you can use the Model Advisor Configuration Editor.

- 1 Open the Model Configuration Editor and navigate to **Check character usage in block names**. In the **Input Parameter** pane:

- Use **Naming standard** to select **MAAB 3.0** or **Custom**. When you select **MAAB 3.0**, the check uses the regular expression `([^a-zA-Z_0-9\n\r])|(^d)|(^)` to verify that names:
 - Use these characters: **a-z**, **A-Z**, **0-9**, underscore (`_`), and blank space.
 - Do not start with a number or blank space.
 - Do not have double byte characters.

When you select **Custom**, you can enter your own **Regular expression for prohibited names**. For example, if you do not want to allow underscores (`_`) in a block name, enter `([^a-zA-Z0-9\r])|(^d)|(^)`.

- 2 Click **Apply**.
- 3 Save the configuration. When you run the check using this configuration, the check uses the input parameters that you specified.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| The block names do not comply with the naming standard specified in the input parameters. | Update the block names to comply with your own guidelines or the MAAB guidelines. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

Tips

Carriage returns are allowed in block names.

See Also

- MAAB guideline, Version 3.0: jc_0231: Usable characters for block names (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0231: Usable characters for block names.

Check Trigger and Enable block names

Check ID: `mathworks.maab.jc_0281`

Check Trigger and Enable block port names.

Description

Block port names should match the name of the signal triggering the subsystem. The check does not flag Trigger or Enable block names if the associated signal does not have a label.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Trigger block does not match the name of the signal to which it is connected. | Match Trigger block names to the connecting signal. |
| Enable block does not match the name of the signal to which it is connected. | Match Enable block names to the connecting signal. |

Capabilities and Limitations

- JMAAB guideline, Version 4.0 limitation: This check only flags Trigger and Enable blocks names.
- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `jc_0281`: Naming of Trigger Port block and Enable Port block (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `jc_0281`: Naming of Trigger Port block and Enable Port block.

Check for Simulink diagrams using nonstandard display attributes

Check ID: mathworks.maab.na_0004

Check model appearance setting attributes.

Description

Model appearance settings are required to conform to the guidelines when the model is released.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The toolbar is not visible. | Select View > Toolbar . |
| Wide Nonscalar Lines is cleared. | Select Display > Signals & Ports > Wide Nonscalar Lines . |
| Viewer Indicators is cleared. | Select Display > Signals & Ports > Viewer Indicators . |
| Testpoint Indicators is cleared. | Select Display > Signals & Ports > Testpoint & Logging Indicators . |
| Port Data Types is selected. | Clear Display > Signals & Ports > Port Data Types . |
| Storage Class is selected. | Clear Display > Signals & Ports > Storage Class . |
| Signal Dimensions is selected. | Clear Display > Signals & Ports > Signal Dimensions . |
| Model Browser is selected. | Clear View > Model Browser > Show Model Browser . |
| Sorted Execution Order is selected. | Clear Display > Blocks > Sorted Execution Order . |
| Model Block Version is selected. | Clear Display > Blocks > Block Version for Referenced Models . |
| Model Block I/O Mismatch is selected. | Clear Display > Blocks > Block I/O Mismatch for Referenced Models . |

| Condition | Recommended Action |
|--|---|
| Library Links is set to Disabled, User Defined or All . | Select Display > Library Links > None . |
| Linearization Indicators is cleared. | Select Display > Signals & Ports > Linearization Indicators . |
| Block backgrounds are not white. | Blocks should have black foregrounds with white backgrounds. Click the specified block and select Format > Foreground Color > Black and Format > Background Color > White . |
| Diagrams do not have white backgrounds. | Select Diagram > Format > Canvas Color > White . |
| Diagrams do not have zoom factor set to 100%. | Select View > Zoom > Normal (100%) . |

Action Results

Clicking **Modify** updates the display attributes to conform to the guideline.

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Does not allow exclusions of blocks or charts.

See Also

- MAAB guideline, Version 3.0: na_0004: Simulink model appearance (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0004: Simulink model appearance.

Check MATLAB code for global variables

Check ID: mathworks.maab.na_0024

Check for global variables in MATLAB code.

Description

Verifies that global variables are not used in any of the following:

- MATLAB code in MATLAB Function blocks
- MATLAB functions defined in Stateflow charts
- Called MATLAB functions

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Global variables are used in one or more of the following: <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Does not allow exclusions of blocks or charts.

See Also

MAAB guideline, Version 3.0: na_0024: Global Variables (Simulink) in the Simulink documentation.

- MAAB guideline, Version 3.0: na_0024: Global Variables (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0024: Global variable.

Check visibility of block port names

Check ID: mathworks.maab.na_0005

Check the visibility of port block names.

Description

An organization applying the MAAB guideline, Version 3.0, must select one of the following alternatives to enforce:

- The names of port blocks are not hidden.
- The name of port blocks must be hidden.

Available with Simulink Verification and Validation.

Input Parameters

All Port names should be shown (Format/Show Name)

Select this check box if all ports should show the name, including subsystems.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Blocks do not show their name and the All Port names should be shown (Format/Show Name) check box is selected. | Change the format of the specified blocks to show names according to the input requirement. |
| Blocks show their name and the All Port names should be shown (Format/Show Name) check box is cleared. | Change the format of the specified blocks to hide names according to the input requirement. |
| Subsystem blocks do not show their port names. | Set the subsystem parameter Show port labels to a value other than none. |
| Subsystem blocks show their port names. | Set the subsystem parameter Show port labels to none. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content in masked subsystems.

- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: na_0005: Port block name visibility in Simulink models (Simulink) in the Simulink documentation.

Check orientation of Subsystem blocks

Check ID: mathworks.maab.jc_0111

Check the orientation of subsystem blocks.

Description

Subsystem inputs must be located on the left side of the block, and outputs must be located on the right side of the block.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Subsystem blocks are not using the right orientation | Rotate the subsystem so that inputs are on the left side of block and outputs are on the right side of the block. |

Capabilities and Limitations

- JMAAB guideline, Version 4.0 limitation: The check does not flag the rotation of subsystems.
- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0111: Direction of Subsystem (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0111: Direction of Subsystem.

Check usage of Relational Operator blocks

Check ID: `mathworks.maab.jc_0131`

Check the position of Constant blocks used in Relational Operator blocks.

Description

When the relational operator is used to compare a signal to a constant value, the constant input should be the second, lower input.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Relational Operator blocks have a Constant block on the first, upper input. | Move the Constant block to the second, lower input. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `jc_0131: Use of Relational Operator block (Simulink)` in the Simulink documentation.
- JMAAB guideline, Version 4.0: `jc_0131: Use of Relational Operator block`.

Check usage of Switch blocks

Check ID: mathworks.maab.jc_0141

Check usage of Switch blocks.

Description

Verifies that the Switch block control input (the second input) is a Boolean value and that the block is configured to pass the first input when the control input is nonzero.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| The Switch block control input (second input) is not a Boolean value. | Change the data type of the control input to Boolean. |
| The Switch block is not configured to pass the first input when the control input is nonzero. | Set the block parameter Criteria for passing first input to <code>u2 ~=0</code> . |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in masked subsystems that have no workspaces and no dialogs.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: jc_0141: Use of the Switch block (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: jc_0141: Use of the Switch block.
- Switch (Simulink) block

Check usage of buses and Mux blocks

Check ID: mathworks.maab.na_0010

Check usage of buses and Mux blocks.

Description

This check verifies the usage of buses and Mux blocks.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The individual scalar input signals for a Mux block do not have common functionality, data types, dimensions, and units. | Modify the scalar input signals such that the specifications match. |
| The output of a Mux block is not a vector. | Change the output of the Mux block to a vector. |
| The input for a Bus Selector block is not a bus signal. | Make sure that the input for all Bus Selector blocks is a bus signal. |

Capabilities and Limitations

- Does not run on library models.
- Does not allow exclusions of blocks or charts.
- Does not flag non-scalar inputs as described in MAAB guideline na_0010: Grouping data flows into signals.

See Also

- MAAB guideline, Version 3.0: na_0010: Grouping data flows into signals (Simulink)in the Simulink documentation.
- “Composite Signals” (Simulink)

Check for bitwise operations in Stateflow charts

Check ID: mathworks.maab.na_0001

Identify bitwise operators (&, |, and ^) in Stateflow charts. If you select **Enable C-bit operations** for a chart, only bitwise operators in expressions containing Boolean data types are reported. Otherwise, all bitwise operators are reported for the chart.

Description

Do not use bitwise operators in Stateflow charts, unless you enable bitwise operations.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Stateflow charts with Enable C-bit operations selected use bitwise operators (&, , and ^) in expressions containing Boolean data types. | Do not use Boolean data types in the specified expressions. |
| The Model Advisor could not determine the data types in expressions with bitwise operations. | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions. |
| Stateflow charts with Enable C-bit operations cleared use bitwise operators (&, , and ^). | To fix this issue, do either of the following: <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

- Applies only to charts that use C as the action language.
- Does not run on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.

- Allows exclusions of blocks and charts.

See Also

- “Binary and Bitwise Operations” (Stateflow) in the Stateflow documentation.
- MAAB guideline, Version 3.0: na_0001: Bitwise Stateflow operators (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0001: Bitwise Stateflow operators.
- “hisf_0003: Usage of bitwise operations” (Simulink) in the Simulink documentation.

Check for comparison operations in Stateflow charts

Check ID: mathworks.maab.na_0013

Identify comparison operations with different data types in Stateflow objects.

Description

Comparisons should be made between variables of the same data types.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Comparison operations with different data types were found. | Revisit the specified operations to avoid comparison operations with different data types. |
| The Model Advisor could not determine the data types in expressions with comparison operations. | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions. |

Capabilities and Limitations

- Does not run on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: na_0013: Comparison operation in Stateflow (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0013: Comparison operation in Stateflow.

Check for unary minus operations on unsigned integers in Stateflow charts

Check ID: `mathworks.maab.jc_0451`

Identify unary minus operations applied to unsigned integers in Stateflow objects.

Description

Do not perform unary minus operations on unsigned integers in Stateflow objects.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Unary minus operations are applied to unsigned integers in Stateflow objects. | Modify the specified objects to remove dependency on unary minus operations. |
| The Model Advisor could not determine the data types in expressions with unary minus operations. | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions. |

Capabilities and Limitations

- Does not run on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: `jc_0451`: Use of unary minus on unsigned integers in Stateflow (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `jc_0451`: Use of unary minus on unsigned integers in Stateflow.

Check for equality operations between floating-point expressions in Stateflow charts

Check ID: mathworks.maab.jc_0481

Identify equal to operations (==) in expressions where at least one side of the expression is a floating-point variable or constant.

Description

Do not use equal to operations with floating-point data types. You can use equal to operations with integer data types.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Expressions use equal to operations (==) where at least one side of the expression is a floating-point variable or constant. | Modify the specified expressions to avoid equal to operations between floating-point expressions. If an equal to operation is required, a margin of error should be defined and used in the operation. |
| The Model Advisor could not determine the data types in expressions with equality operations. | To allow Model Advisor to determine the data types, consider explicitly typecasting the specified expressions. |

Capabilities and Limitations

- Does not run on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

MAAB guideline, Version 3.0: jc_0481: Use of hard equality comparisons for floating point numbers in Stateflow (Simulink) in the Simulink documentation.

Check input and output settings of MATLAB Functions

Check ID: mathworks.maab.na_0034

Identify MATLAB Functions that have inputs, outputs or parameters with inherited complexity or data type properties.

Description

The check identifies MATLAB Functions with inherited complexity or data type properties. A results table provides links to MATLAB Functions that do not pass the check, along with conditions triggering the warning.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| MATLAB Functions have inherited interfaces. | <p>Explicitly define complexity and data type properties for inports, outports, and parameters of MATLAB Function identified in the results.</p> <p>If applicable, using the “MATLAB Function Block Editor” (Simulink), make the following modifications in the “Ports and Data Manager” (Simulink):</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. |

Capabilities and Limitations

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.

- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: na_0034: MATLAB Function block input/output settings (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0034: MATLAB Function block input/output settings.

Check MATLAB Function metrics

Check ID: `mathworks.maab.himl_0003`

Display complexity and code metrics for MATLAB Functions. Report metric violations.

Description

This check provides complexity and code metrics for MATLAB Functions. The check additionally reports metric violations.

A results table provides links to MATLAB Functions that violate the complexity input parameters.

Available with Simulink Verification and Validation.

Input Parameters

Maximum effective lines of code per function

Provide the maximum effective lines of code per function. Effective lines do not include empty lines, comment lines, or lines with a function `end` keyword.

Minimum density of comments

Provide minimum density of comments. Density is ratio of comment lines to total lines of code.

Maximum cyclomatic complexity per function

Provide maximum cyclomatic complexity per function. Cyclomatic complexity is the number of linearly independent paths through the source code.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| MATLAB Function violates the complexity input parameters. | For the MATLAB Function: <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

- Runs on library models.
- Does not analyze content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: na_0016: Source lines of MATLAB Functions (Simulink) in the Simulink documentation.
- MAAB guideline, Version 3.0: na_0018: Number of nested if/else and case statement (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: na_0016: Source lines of MATLAB Functions.
- JMAAB guideline, Version 4.0: na_0018: Number of nested if/else and case statement.

Check for mismatches between names of Stateflow ports and associated signals

Check ID: `mathworks.maab.db_0123`

Check for mismatches between Stateflow ports and associated signal names.

Description

The name of Stateflow input and output should be the same as the corresponding signal. The check does not flag:

- Name mismatches for reusable Stateflow charts in libraries.
- Stateflow ports if the corresponding signal does not have a label.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Signals have names that differ from the corresponding Stateflow ports. | Change the names of either the signals or the Stateflow ports. |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts. Exclusions will not work for library linked charts.

See Also

- MAAB guideline, Version 3.0: `db_0123`: Stateflow port names (Simulink) in the Simulink documentation.
- JMAAB guideline, Version 4.0: `db_0123`: Stateflow port names.

Check scope of From and Goto blocks

Check ID: mathworks.maab.na_0011

Check the scope of From and Goto blocks.

Description

You can use global scope for controlling flow. However, From and Goto blocks must use local scope for signal flows.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| From and Goto blocks are not configured with local scope. | <ul style="list-style-type: none">• Make sure that the ports are connected.• Change the scope of the specified blocks to local. |

Capabilities and Limitations

- Does not run on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- Allows exclusions of blocks and charts.

See Also

- MAAB guideline, Version 3.0: na_0011: Scope of Goto and From blocks (Simulink) in the Simulink documentation.

MISRA C:2012 Checks

In this section...

“Check usage of Assignment blocks” on page 3-218

“Check for blocks not recommended for MISRA C:2012” on page 3-219

“Check for unsupported block names” on page 3-220

“Check configuration parameters for MISRA C:2012” on page 3-221

“Check for equality and inequality operations on floating-point values” on page 3-224

“Check for bitwise operations on signed integers” on page 3-224

“Check for recursive function calls” on page 3-225

“Check for switch case expressions without a default case” on page 3-226

“Check for blocks not recommended for C/C++ production code deployment” on page 3-226

Check usage of Assignment blocks

Check ID: `mathworks.misra.AssignmentBlocks`

Identify Assignment blocks that do not have block parameter **Action if any output element is not assigned** set to **Error** or **Warning**.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| The model or subsystem might contain Assignment blocks with incomplete array initialization that do not have block parameter Action if any output element is not assigned set to Error or Warning . | Set block parameter Action if any output element is not assigned to one of the recommended values: <ul style="list-style-type: none"> Error, if Assignment block is not in an Iterator subsystem. |

| Condition | Recommended Action |
|-----------|--|
| | <ul style="list-style-type: none"> • Warning, if Assignment block is in an Iterator subsystem. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- If you have a Simulink Verification and Validation license, allows exclusions of blocks and charts.

See Also

- MISRA C:2012, Rule 9.1
- “hisl_0029: Usage of Assignment blocks” (Simulink)
“MISRA C Guidelines” (Embedded Coder).
- “MISRA C:2012 Compliance Considerations” (Simulink)

Check for blocks not recommended for MISRA C:2012

Check ID: `mathworks.misra.BlkSupport`

Identify blocks that are not supported or recommended for MISRA C:2012 compliant code generation.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Lookup Table blocks using cubic spline interpolation or extrapolation methods were found in the model or subsystem. | Consider other interpolation and extrapolation methods for the Lookup Table blocks. |

| Condition | Recommended Action |
|--|--|
| Deprecated Lookup Table blocks were found in the model or subsystem. | Consider replacing the deprecated Lookup Table blocks. |
| S-Function Builder blocks were found in the model or subsystem. | Consider replacing the S-Function Builder blocks by blocks recommended for production. |

Capabilities and Limitations

You can:

- Run this check on your library models.
- Exclude blocks and charts from this check if you have a Simulink Verification and Validation license.

See Also

- “hisl_0020: Blocks not recommended for MISRA C:2012 compliance” (Simulink)
- “MISRA C Guidelines” (Embedded Coder)
- “MISRA C:2012 Compliance Considerations” (Simulink)
- “What Is a Model Advisor Exclusion?”

Check for unsupported block names

Check ID: `mathworks.misra.BlockNames`

Identify block names containing `/`.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| Block names containing <code>/</code> were found in the model or subsystem. | Remove <code>/</code> from the block name. |

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library linked blocks.
- Analyzes content in all masked subsystems.
- If you have a Simulink Verification and Validation license, allows exclusions of blocks and charts.

See Also

- MISRA C:2012, Rule 3.1
- “MISRA C Guidelines” (Embedded Coder).
- “MISRA C:2012 Compliance Considerations” (Simulink)

Check configuration parameters for MISRA C:2012

Check ID: `mathworks.misra.CodeGenSettings`

Identify configuration parameters that might impact MISRA C:2012 compliant code generation.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|--|
| Model Verification block enabling is set to Use local settings or Enable All. | In the Configuration Parameters dialog box, on the All Parameters tab, set Model Verification block enabling to Disable All . |
| System target file is set to a GRT-based target. | In the Configuration Parameters dialog box, on the Code Generation > General pane, set System target file to an ERT-based target. |

| Condition | Recommended Action |
|--|---|
| <p>Code Generation > Interface parameters are not set to the recommended values.</p> | <p>In the Configuration Parameters dialog box, on the Code Generation > Interface pane:</p> <ul style="list-style-type: none"> • Set Code replacement library to None or AUTOSAR 4.0 • Set Shared code placement to Shared location • Clear Support: non-finite numbers • Clear Support: continuous time (ERT-based target only) <p>In the Configuration Parameters dialog box, on the All Parameters tab:</p> <ul style="list-style-type: none"> • Clear Support non-inlined S-functions (ERT-based target only) • Clear MAT-file logging |
| <p>Parenthesis level is not set to Maximum (Specify precedence with parentheses).</p> | <p>In the Configuration Parameters dialog box, on the Code Generation > Code Style pane, set Parentheses level to Maximum (Specify precedence with parentheses).</p> |
| <p>Casting Modes is not set to Standards Compliant.</p> | <p>In the Configuration Parameters dialog box, on the Code Generation > Code Style pane, set Casting Modes to Standards Compliant.</p> |
| <p><code>GenerateSharedConstants</code> is set to on.</p> | <p>Use <code>get_param</code> to set <code>GenerateSharedConstants</code> to off.</p> |
| <p>System-generated identifiers is set to Classic.</p> | <p>In the Configuration Parameters dialog box, on the Code Generation > Symbols pane, set System-generated identifiers to Shortened.</p> |

| Condition | Recommended Action |
|---|---|
| Pack Boolean data into bitfields is selected and Bitfield declarator type specifier is set to <code>uchar_T</code> . | In the Configuration Parameters dialog box, on the Optimization > Signals and Parameters pane, if Pack Boolean data into bitfields is selected, set Bitfield declarator type specifier to <code>uint_T</code> . |
| Signed integer division rounds to is not set to Zero or Floor . | In the Configuration Parameters dialog box, on the Hardware Implementation pane, set Signed integer division rounds to to Zero or Floor . |
| Use division for fixed-point net slope computation is not set to on or Use division for reciprocals of integers only . | In the Configuration Parameters dialog box, on the Optimization pane, set Use division for fixed-point net slope computation to On or Use division for reciprocals of integers only . |
| Replace multiplications by powers of two with signed bitwise shifts is selected. | In the Configuration Parameters dialog box, on the Code Generation > Code Style pane, Clear Replace multiplications by powers of two with signed bitwise shifts . |
| Allow right shifts on signed integers is selected. | In the Configuration Parameters dialog box, on the Code Generation > Code Style pane, Clear Allow right shifts on signed integers . |
| Use dynamic memory allocation for model initialization is selected. | In the Configuration Parameters dialog box, on the All Parameters tab, clear Use dynamic memory allocation for model initialization . |

Action Results

Clicking **Modify All** changes the parameter values to the recommended values.

Capabilities and Limitations

This check does not review referenced models.

See Also

- “hisl_0060: Configuration parameters that improve MISRA C:2012 compliance” (Simulink)
- “MISRA C Guidelines” (Embedded Coder)
- “MISRA C:2012 Compliance Considerations” (Simulink)

Check for equality and inequality operations on floating-point values**Check ID:** `mathworks.misra.CompareFloatEquality`

Identify equality and inequality operations on floating-point values.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications. The check flags sources causing equality or inequality operations on floating-point values.

The check does not flag blocks with equality or inequality operations on floating-point values if they are justified with a Polyspace® annotation. When you run the check, the **Blocks with justification** table lists blocks with equality or inequality operations that have a justification.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Model object has an equality or inequality operation on a floating-point value. | Consider using non-floating-point values for equality or inequality operations. |

See Also

- MISRA C:2012, Dir 1.1
- “Annotate Blocks for Known Results” (Polyspace Bug Finder)

Check for bitwise operations on signed integers**Check ID:** `mathworks.misra.CompliantCGIRConstructions`

Identify Simulink blocks that contain bitwise operations on signed integers. The check does not flag MATLAB Function or Stateflow blocks that use signed operands for bitwise operators.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|--|
| The model or subsystem has blocks that contain bitwise operations on signed integers. | Consider using unsigned integers for bitwise operations. |

See Also

- “hisl_0060: Configuration parameters that improve MISRA C:2012 compliance” (Simulink)
- “MISRA C:2012 Compliance Considerations” (Simulink)

Check for recursive function calls

Check ID: `mathworks.misra.RecursionCompliance`

Identify recursive function calls in Stateflow charts.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications. The check flags charts that have recursive function calls.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--------------------------------------|---------------------------------|
| Chart has a recursive function call. | Remove recursive function call. |

See Also

- MISRA C:2012, Dir 17.2
- “Guidelines for Avoiding Unwanted Recursion in a Chart” (Stateflow)

Check for switch case expressions without a default case

Check ID: `mathworks.misra.SwitchDefault`

Identify switch case expressions that do not have a default case.

Description

Following the recommendations of this check increases the likelihood of generating MISRA C:2012 compliant code for embedded applications. The check flags model objects that have switch case expressions without a default case.

The check does not flag blocks without default cases if they are justified with a Polyspace annotation. When you run the check, the **Blocks with justification** table lists blocks without default cases that have a justification.

Available with Embedded Coder and Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|---|---|
| Model object has a switch case expression without a default case. | For Switch Case blocks, consider selecting block parameter Show default case to explicitly specify a default case. |

See Also

- MISRA C:2012, Rule 16.4
- “Annotate Blocks for Known Results” (Polyspace Bug Finder)

Check for blocks not recommended for C/C++ production code deployment

Check ID: `mathworks.codegen.PCGSupport`

Identify blocks not supported by code generation or not recommended for C/C++ production code deployment.

Description

This check partially identifies model constructs that are not recommended for C/C++ production code generation as identified in the Simulink Block Support (Simulink Coder) 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 if you have a Simulink Verification and Validation license.

See Also

- “Supported Products and Block Usage” (Simulink Coder)
- “What Is a Model Advisor Exclusion?”

Requirements Consistency Checks

In this section...

“Identify requirement links with missing documents” on page 3-229

“Identify requirement links that specify invalid locations within documents” on page 3-230

“Identify selection-based links having descriptions that do not match their requirements document text” on page 3-231

“Identify requirement links with path type inconsistent with preferences” on page 3-233

“Identify IBM Rational DOORS objects linked from Simulink that do not link to Simulink” on page 3-235

Identify requirement links with missing documents

Check ID: mathworks.req.Documents

Verify that requirements link to existing documents.

Description

You used the Requirements Management Interface (RMI) to associate a design requirements document with a part of your model design and the interface cannot find the specified document.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The requirements document associated with a part of your model design is not accessible at the specified location. | Open the Requirements dialog box and fix the path name of the requirements document or move the document to the specified location. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

Tips

If your model has links to a DOORS requirements document, to run this check, the DOORS software must be open and you must be logged in.

See Also

“Maintenance of Requirements Links”

Identify requirement links that specify invalid locations within documents

Check ID: `mathworks.req.Identifiers`

Verify that requirements link to valid locations (e.g., bookmarks, line numbers, anchors) within documents.

Description

You used the Requirements Management Interface (RMI) to associate a location in a design requirements document (a bookmark, line number, or anchor) with a part of your model design and the interface cannot find the specified location in the specified document.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The location in the requirements document associated with a part of your model design is not accessible. | Open the Requirements dialog box and fix the location reference within the requirements document. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

Tips

If your model has links to a DOORS requirements document, to run this check, the DOORS software must be open and you must be logged in.

If your model has links to a Microsoft Word or Microsoft Excel document, to run this check, those applications must be closed on your computer.

See Also

“Maintenance of Requirements Links”

Identify selection-based links having descriptions that do not match their requirements document text

Check ID: `mathworks.req.Labels`

Verify that descriptions of selection-based links use the same text found in their requirements documents.

Description

You used selection-based linking of the Requirements Management Interface (RMI) to label requirements in the model's **Requirements** menu with text that appears in the corresponding requirements document. This check helps you manage traceability by identifying requirement descriptions in the menu that are not synchronized with text in the documents.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| Selection-based links have descriptions that differ from their corresponding selections in the requirements documents. | If the difference reflects a change in the requirements document, click Update in the Model Advisor results to replace the current description in the selection-based link with the text from the requirements document (the external description). Alternatively, you can right-click the object in the model window, select Edit/Add Links from the Requirements menu, and use the Requirements dialog box that appears to synchronize the text. |

Capabilities and Limitations

You can exclude blocks and charts from this check.

Tips

If your model has links to a DOORS requirements document, to run this check, the DOORS software must be open and you must be logged in.

If your model has links to a Microsoft Word or Microsoft Excel document, to run this check, those applications must be closed on your computer.

See Also

“Maintenance of Requirements Links”

Identify requirement links with path type inconsistent with preferences

Check ID: mathworks.req.Paths

Check that requirement paths are of the type selected in the preferences.

Description

You are using the Requirements Management Interface (RMI) and the paths specifying the location of your requirements documents differ from the file reference type set as your preference.

Available with Simulink Verification and Validation.

Results and Recommended Actions

| Condition | Recommended Action |
|--|---|
| The paths indicating the location of requirements documents use a file reference type that differs from the preference specified in the Requirements Settings dialog box, on the Selection Linking tab. | Change the preferred document file reference type or the specified paths by doing one of the following: <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.

Model Metrics

In this section...

“Model Metrics” on page 3-237

“Count Metrics” on page 3-237

“Complexity Metrics” on page 3-238

“Readability Metrics” on page 3-238

“Compliance Metrics” on page 3-239

“Simulink block metric” on page 3-240

“Subsystem metric” on page 3-242

“Library link metric” on page 3-244

“Effective lines of MATLAB code metric” on page 3-246

“Stateflow chart objects metric” on page 3-248

“Lines of code for Stateflow blocks metric” on page 3-250

“Subsystem depth metric” on page 3-252

“Input output metric” on page 3-253

“Cyclomatic complexity metric” on page 3-255

“Nondescriptive block name metric” on page 3-257

“Data and structure layer separation metric” on page 3-258

“MATLAB code analyzer warnings” on page 3-259

“Model Advisor Check Compliance for Modeling Guidelines for MISRA C:2012” on page 3-260

“Model Advisor Check Compliance for Modeling Standards for DO-178C/DO-331 ” on page 3-261

“Model Advisor Check Compliance for Modeling Standards for ISO 26262 ” on page 3-262

“Model Advisor Check Compliance for Modeling Standards for MAAB” on page 3-263

“Model Advisor Check Issues for Modeling Guidelines for MISRA C:2012” on page 3-264

“Model Advisor Check Issues for Modeling Standards for DO-178C/DO-331” on page 3-265

In this section...

“Model Advisor Check Issues for Modeling Standards for ISO 26262” on page 3-266

“Model Advisor check issues for MAAB Standards” on page 3-267

Model Metrics

Model metrics analyze your model and help you assess your model for complexity, size, readability, testability, and compliance to standards. Simulink Verification and Validation provides the metrics for these metric types:

- “Count Metrics” on page 3-237
- “Complexity Metrics” on page 3-238
- “Readability Metrics” on page 3-238
- “Compliance Metrics” on page 3-239

Using the Model Advisor, you can see if your model or subsystem comply with DO-331, IEC 61508, IEC 62304, ISO 26262, and EN 50128 standards. To run the model metrics and display model count, complexity, and readability metrics for your model or subsystem, see “Collect Model Metrics Using the Model Advisor”.

You can use the model metric API to run the model metrics programmatically and export the results to a file. For more information, see “Collect Model Metrics Programmatically”.

For your company guidelines and standards, you can also use the model metric API to create your own model metrics, compute those metrics, and export the metric data. For more information, see “Create a Custom Model Metric”.

Count Metrics

Run these metrics to collect metric data on a model or subsystem.

| Metric | Description |
|---------------------------------------|--|
| “Simulink block metric” on page 3-240 | Calculates the number of blocks in the model. |
| “Subsystem metric” on page 3-242 | Calculates the number of subsystems in the model. |
| “Library link metric” on page 3-244 | Calculates the number of library-linked blocks in the model. |

| Metric | Description |
|---|--|
| “Effective lines of MATLAB code metric” on page 3-246 | Calculates the number of effective lines of MATLAB code. |
| “Stateflow chart objects metric” on page 3-248 | Calculates the number of Stateflow objects. |
| “Lines of code for Stateflow blocks metric” on page 3-250 | Calculates the number of code lines for the following Stateflow blocks in the model: <ul style="list-style-type: none">• States• Transitions• Truth tables |
| “Subsystem depth metric” on page 3-252 | Calculates the subsystem depth of the model. |
| “Input output metric” on page 3-253 | Calculates the number of inports and outports in your model. |

For more information on model metrics, see “Collect Model Metric Data”.

Complexity Metrics

Run this metric to determine the cyclomatic complexity for a model or subsystem.

| Metric | Description |
|--|--|
| “Cyclomatic complexity metric” on page 3-255 | Calculates the cyclomatic complexity of the model. |

For more information on model metrics, see “Collect Model Metric Data”.

Readability Metrics

Run these metrics to determine readability for a model or subsystem.

| Metric | Description |
|--|---|
| “Nondescriptive block name metric” on page 3-257 | Determines nondescriptive Inport, Outport, and Subsystem block names. |

| Metric | Description |
|--|---|
| “Data and structure layer separation metric” on page 3-258 | Calculates the data and structure layer separation. |

For more information on model metrics, see “Collect Model Metric Data”.

Compliance Metrics

Run one or more of these metrics to determine if your model or subsystem is compliant with standards and guidelines.

| Metric | Description |
|---|--|
| “MATLAB code analyzer warnings” on page 3-259 | Determines warnings for MATLAB code blocks in your model. |
| “Model Advisor Check Compliance for Modeling Guidelines for MISRA C:2012” on page 3-260 | Returns the fraction of checks the model passes from Model Advisor MISRA C:2012 Guidelines. |
| “Model Advisor Check Compliance for Modeling Standards for DO-178C/DO-331 ” on page 3-261 | Returns the fraction of checks the model passes from Model Advisor DO-178C/DO-331 Standards. |
| “Model Advisor Check Compliance for Modeling Standards for ISO 26262 ” on page 3-262 | Returns the fraction of checks the model passes from Model Advisor ISO 26262 Standards. |
| “Model Advisor Check Compliance for Modeling Standards for MAAB” on page 3-263 | Returns the fraction of checks the model passes from Model Advisor MAAB Standard. |
| “Model Advisor Check Issues for Modeling Guidelines for MISRA C:2012” on page 3-264 | Reports the number of issues from Model Advisor MISRA C:2012 Guidelines. |
| “Model Advisor Check Issues for Modeling | Reports the number of issues from Model Advisor DO-178C/DO-331 Standards. |

| Metric | Description |
|---|--|
| Standards for DO-178C/DO-331” on page 3-265 | |
| “Model Advisor Check Issues for Modeling Standards for ISO 26262” on page 3-266 | Reports the number of issues from Model Advisor ISO 26262 Standards. |
| “Model Advisor check issues for MAAB Standards” on page 3-267 | Reports the number of issues from Model Advisor MAAB Standard. |

For more information on model metrics, see “Collect Model Metric Data”.

Simulink block metric

Metric Type: Count

Metric ID: `mathworks.metrics.SimulinkBlockCount`

Calculate the number of Simulink blocks in the model

Description

Use this metric to calculate the number of blocks in the model. The results provide the number of blocks at the model and subsystem level. This metric counts Simulink—based blocks, but does not include underlying blocks used to implement the block. This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Simulink block metric** in **By Task > Model Metrics > Count Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.SimulinkBlockCount`.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of blocks.
- **AggregatedValue:** Number of blocks for component and its subcomponents.
- **Measures:** Not applicable.

Note: The results from metric analysis of **Simulink block metric** might differ from calling `sldiagnostics`. The result of the Simulink block metric:

- Includes referenced models.
 - Does not include any underlying blocks used to implement a MathWorks block that you used from the Simulink Library Browser.
 - Does not include links into MathWorks libraries, which means that MathWorks library blocks that are masked subsystems are counted as one block. The inner content of those blocks are not counted.
 - Does not include hidden content under Stateflow Charts or MATLAB Function blocks.
-

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.

See Also

For more information on model metrics, see “Collect Model Metric Data”.

Subsystem metric

Metric Type: Count

Metric ID: `mathworks.metrics.SubSystemCount`

Display number of subsystems in the model

Description

Use this metric to calculate the number of subsystems in the model. The results provide the number of subsystems at the model and subsystem level.

This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Subsystem metric** in **By Task > Model Metrics > Count Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.SubSystemCount`.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of subsystems.
- **AggregatedValue:** Number of subsystems for a component and its subcomponent.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.

See Also

For more information on model metrics, see “Collect Model Metric Data”.

Library link metric

Metric Type: Count

Metric ID: `mathworks.metrics.LibraryLinkCount`

Display number of library links in the model

Description

Use this metric to calculate the number of library-linked blocks in the model. The results provide the number of library-linked blocks at the model and subsystem level.

This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Library link metric** in **By Task > Model Metrics > Count Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.LibraryLinkCount`.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of library linked blocks.
- **AggregatedValue:** Number of library linked blocks for a component and its subcomponents.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.

See Also

For more information on model metrics, see “Collect Model Metric Data”.

Effective lines of MATLAB code metric

Metric Type: Count

Metric ID: `mathworks.metrics.MatlabLOCCount`

Display number of effective lines of MATLAB code

Description

Run this metric to calculate the number of effective lines of MATLAB code. Effective lines of MATLAB code are lines of executable code. Empty lines, lines that contain only comments, and lines that contain only an end statement are not considered effective lines of code. The results provide the number of effective lines of MATLAB code for each MATLAB Function block and for MATLAB functions in Stateflow charts.

This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Effective lines of MATLAB code metric** in **By Task > Model Metrics > Count Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.MatlabLOCCount`.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of effective lines of MATLAB code.
- **AggregatedValue:** Number of effective lines of MATLAB code for a component and its subcomponents.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Does not analyze the content of MATLAB code in external files.

See Also

For more information on model metrics, see “Collect Model Metric Data”.

Stateflow chart objects metric

Metric Type: Count

Metric ID: `mathworks.metrics.StateflowChartObjectCount`

Display the number of Stateflow objects in each chart

Description

Run this metric to calculate the number of Stateflow objects. For each chart in the model, the results provide the number of the following Stateflow objects:

- Atomic subcharts
- Boxes
- Data objects
- Events
- Graphical functions
- Junctions
- Linked charts
- MATLAB functions
- Notes
- Simulink functions
- States
- Transitions
- Truth tables

This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Stateflow chart objects metric** in **By Task > Model Metrics > Count Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.StateflowChartObjectCount`.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`

- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of Stateflow objects.
- **AggregatedValue:** Number of Stateflow objects for a component and its subcomponents.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.

See Also

For more information on model metrics, see “Collect Model Metric Data”.

Lines of code for Stateflow blocks metric

Metric Type: Count

Metric ID: `mathworks.metrics.StateflowLOCCount`

Display the number of effective lines of code for Stateflow blocks

Description

Use this metric to calculate the number of effective lines of code in Stateflow. Effective lines of MATLAB code are lines of executable code. Empty lines, lines that contain only comments, and lines that contain only an end statement are not considered effective lines of code. This metric calculates the lines of code for the following Stateflow blocks in the model:

- Chart, counting the code on Transitions and inside States
- State Transition Table block
- Truth Table block

This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Lines of code for Stateflow blocks metric** in **By Task > Model Metrics > Count Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.StateflowLOCCount`.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of Stateflow block code lines.
- **AggregatedValue:** Number of Stateflow block code lines for a component and its subcomponents.

- **Measures:** Vector with two entries: number of effective lines of code in MATLAB action language and number of effective lines of code in C action language.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.

See Also

For more information on model metrics, see “Collect Model Metric Data”.

Subsystem depth metric

Metric Type: Count

Metric ID: `mathworks.metrics.SubSystemDepth`

Calculates the maximum depth of all hierarchical children of a subsystem or model

Description

Use this metric to count the maximum depth of all hierarchical children for a given subsystem or model starting from the given component, or root of analysis. The depth is the relative depth of the deepest branch. Depth traversal analysis stops when it reaches a referenced model or a library. Depth and level is restarted with 0 for each of these components.

This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Subsystem depth metric** in **By Task > Model Metrics > Count Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.SubSystemDepth`.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: None`
- `slmetric.metric.AggregateComponentDetails: false`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** subsystem depth for each component in the hierarchy.
- **AggregatedValue:** Not applicable.
- **Measure:** level of component in the hierarchy.
- **AggregatedMeasure:** Not applicable.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.

See Also

For more information on model metrics, see “Collect Model Metric Data”.

Input output metric

Metric Type: Count

Metric ID: `mathworks.metrics.IOCount`

Display number of inputs and outputs in the model

Description

Use this metric to calculate the number of inputs and outputs in the model, which include:

- Inputs: Inport blocks, Trigger ports, Enable ports, chart input data and events.
- Outputs: Outport blocks, chart output data and events.
- Implicit inputs: From block, where the matching Goto block is outside of the component.
- Implicit outputs: Goto block, where the matching From block is outside of the component.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Max`
- `slmetric.metric.AggregateComponentDetails: false`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** total interface size or sum of the elements of **Measures**.
- **AggregatedValue:** Number of inputs and outputs for a component and its subcomponents.

- **Measures:** Array consisting of number of inputs, number of outputs, number of implicit inputs, and number of implicit outputs, which are local to the component.
- **AggregatedMeasures:** Maximum number of inputs, outputs, implicit inputs, and implicit outputs for a component and subcomponents.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- If specified, analyzes the content of library-linked blocks or referenced models.

See Also

For more information on model metrics, see “Collect Model Metric Data”.

Cyclomatic complexity metric

Metric Type: Complexity

Metric ID: `mathworks.metrics.CyclomaticComplexity`

Display the local and aggregated cyclomatic complexity of the model

Description

Use this metric to calculate the cyclomatic complexity of the model. The results provide the local and aggregated cyclomatic complexity for the:

- Model
- Subsystems
- Charts
- States in charts
- MATLAB functions

Local complexity is the cyclomatic complexity for objects at their hierarchical level. Aggregated cyclomatic complexity is the cyclomatic complexity of an object and its descendants.

This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Cyclomatic complexity metric** in **By Task > Model Metrics > Complexity Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.CyclomaticComplexity`.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Local cyclomatic complexity.

- **AggregatedValue:** Aggregated cyclomatic complexity.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Does not run on library models.
- Analyzes content in masked subsystems.

See Also

- “Collect Model Metric Data”
- “Cyclomatic Complexity for Stateflow Charts”
- “Specify Coverage Options”

Nondescriptive block name metric

Metric Type: Readability

Check ID: `mathworks.metrics.DescriptiveBlockNames`

Display nondescriptive Inport, Outport, and Subsystem block names

Description

Run this metric to determine nondescriptive Inport, Outport, and Subsystem block names. Default names appended with an integer are nondescriptive block names. The results provide the nondescriptive block names at the model and subsystem levels.

This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Nondescriptive block name metric** in **By Task > Model Metrics > Readability Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.DescriptiveBlockNames`.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of nondescriptive Inport, Outport, and Subsystem block names.
- **AggregatedValue:** Number of nondescriptive Inport, Outport, and Subsystem block names for a component and its subcomponents.
- **Measures:** 1-D vector containing:
 - Total number of Inport blocks
 - Number of Inport blocks with nondescriptive names
 - Total number of Outport blocks
 - Number of Outport blocks with nondescriptive names

- Total number of Subsystem blocks
- Number of Subsystem blocks with nondescriptive names
- **AggregatedMeasures:** 1-D vector containing sum of:
 - Total number of Inport blocks
 - Number of Inport blocks with nondescriptive names
 - Total number of Outport blocks
 - Number of Outport blocks with nondescriptive names
 - Total number of Subsystem blocks
 - Number of Subsystem blocks with nondescriptive names

Capabilities and Limitations

The metric:

- Does not run on library models.
- Analyzes content in masked subsystems.

See Also

For more information on model metrics, see “Collect Model Metric Data”

Data and structure layer separation metric

Metric Type: Readability

Metric ID: `mathworks.metrics.LayerSeparation`

Display data and structure layer separation

Description

Run this metric to calculate the data and structure layer separation. The results provide the separation at the model and subsystem level.

Run this metric to calculate the data and structure layer separation. The results provide the separation at the model and subsystem levels.

This metric is available with Simulink Verification and Validation. To collect data for this metric:

- Using the Model Advisor, run the check, **Data and structure layer separation metric** in **By Task > Model Metrics > Readability Metrics**.
- Programmatically, use `slmetric.Engine.getMetrics` with the metric identifier, `mathworks.metrics.LayerSeparation`.

For guidelines about blocks on model levels, see the MAAB 3.0 guideline db_0143: Similar block types on the model levels (Simulink).

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of basic blocks on a structural level.
- **AggregatedValue:** Number of basic blocks on a structural level for a component and its subcomponents.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Does not run on library models.
- Analyzes content in masked subsystems.

See Also

For more information on model metrics, see “Collect Model Metric Data”

MATLAB code analyzer warnings

Metric Type: Compliance

Metric ID: `mathworks.metrics.MatlabCodeAnalyzerWarnings`

Use this metric to calculate the number of MATLAB code analyzer warnings from MATLAB code in the model

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode`: Sum
- `slmetric.metric.AggregateComponentDetails`: true

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value**: Number of MATLAB code analyzer warnings
- **AggregatedValue**: Number of MATLAB code analyzer warnings aggregated for a component and subcomponents.
- **Measures**: Not applicable.

Capabilities and Limitations

The metric:

- Analyzes MATLAB code in MATLAB Function blocks
- Analyzes MATLAB functions in Stateflow charts
- Runs on library models
- Analyzes content in masked subsystems
- If specified, analyzes content of library-linked blocks and referenced models
- Does not analyze external MATLAB code files

See Also

- “Collect Model Metric Data”
- “Check Code for Errors and Warnings” (MATLAB)

Model Advisor Check Compliance for Modeling Guidelines for MISRA C:2012

Metric Type: Compliance

Metric ID: `mathworks.metrics.ModelAdvisorCheckCompliance.misra_c`

Use this metric to calculate the fraction of Model Advisor checks that pass for the group **Modeling Guidelines for MISRA C:2012**.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Percentile`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Fraction of total number of checks passed in MISRA C:2012.
- **AggregatedValue:** Fraction of total number of checks passed in MISRA C:2012 aggregated for a component and all of its subcomponents.
- **Measures:** Vector containing: number of checks passed in group and number of checks in group.
- **AggregatedMeasures:** Vector containing: number of checks passed in group and number of checks in group, for a component and all its subcomponents.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Analyzes the content of library-linked blocks or referenced models if specified.
- Analyzes content in Stateflow objects.

See Also

- “Collect Model Metric Data”
- “Model Checks for MISRA C:2012 Compliance”

Model Advisor Check Compliance for Modeling Standards for DO-178C/DO-331

Metric Type: Compliance

Metric ID: `mathworks.metrics.ModelAdvisorCheckCompliance.do178`

Use this metric to calculate the fraction of Model Advisor checks that pass for the group **Modeling Standards for DO-178C/DO-331**

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Percentile`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Fraction of total number of checks passed in DO-178C/DO-331.
- **AggregatedValue:** Fraction of total number of checks passed in DO-178C/DO-331 aggregated for a component and all of its subcomponents.
- **Measures:** Vector containing: number of checks passed in group and number of checks in group.
- **AggregatedMeasures:** Vector containing: number of checks passed in group and number of checks in group, for a component and all its subcomponents.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Analyzes the content of library-linked blocks or referenced models if specified.
- Analyzes content in Stateflow objects.

See Also

- “Collect Model Metric Data”
- “Model Checks for DO-178C/DO-331 Standard Compliance”

Model Advisor Check Compliance for Modeling Standards for ISO 26262

Metric Type: Compliance

Metric ID: `mathworks.metrics.ModelAdvisorCheckCompliance.ISO26262`

Use this metric to calculate the fraction of Model Advisor checks that pass for the group **Modeling Standards for ISO 26262**

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Percentile`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Fraction of total number of checks passed in ISO 26262.
- **AggregatedValue:** Fraction of total number of checks passed in ISO 26262 aggregated for a component and all of its subcomponents.
- **Measures:** Vector containing: number of checks passed in group and number of checks in group.
- **AggregatedMeasures:** Vector containing: number of checks passed in group and number of checks in group, for a component and all its subcomponents.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Analyzes the content of library-linked blocks or referenced models if specified.
- Analyzes content in Stateflow objects.

See Also

- “Collect Model Metric Data”
- “Model Checks for IEC 61508, IEC 62304, ISO 26262, and EN 50128 Standard Compliance”

Model Advisor Check Compliance for Modeling Standards for MAAB

Metric Type: Compliance

Metric ID: `mathworks.metrics.ModelAdvisorCheckCompliance.maab`

Use this metric to calculate the fraction of Model Advisor checks that pass for the group **Modeling Standards for MAAB**

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Percentile`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Fraction of total number of checks passed in MAAB.
- **AggregatedValue:** Fraction of total number of checks passed in MAAB aggregated for a component and all of its subcomponents.
- **Measures:** Vector containing: number of checks passed in group and number of checks in group.
- **AggregatedMeasures:** Vector containing: number of checks passed in group and number of checks in group, for a component and all its subcomponents.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Analyzes the content of library-linked blocks or referenced models if specified.
- Analyzes content in Stateflow objects.

See Also

- “Collect Model Metric Data”
- “Model Checks for MathWorks Automotive Advisory Board (MAAB) Guideline Compliance”

Model Advisor Check Issues for Modeling Guidelines for MISRA C:2012

Metric Type: Compliance

Metric ID: `mathworks.metrics.ModelAdvisorCheckIssues.misra_c`

Use this metric to calculate number of issues reported by the group of Model Advisor checks for **Modeling Guidelines for MISRA C:2012** checks. An issue is a Simulink

object that the Model Advisor check flags. You see an issue in the check output as a hyperlink and in the Simulink Editor with Model Advisor highlighting.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of issues reported by the Model Advisor for MISRA C:2012 checks.
- **AggregatedValue:** Number of issues reported by the Model Advisor for MISRA C:2012 checks aggregated for a component and all of its subcomponents.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Analyzes the content of library-linked blocks or referenced models if specified.
- Analyzes content in Stateflow objects.
- Does not count checks on the configuration set or issues with data objects.

See Also

- “Collect Model Metric Data”
- • “Model Checks for MISRA C:2012 Compliance”

Model Advisor Check Issues for Modeling Standards for DO-178C/DO-331

Metric Type: Compliance

Metric ID: `mathworks.metrics.ModelAdvisorCheckIssues.do178`

Use this metric to calculate number of issues reported by the group of Model Advisor checks for **Modeling Standards for DO-178C/DO-331**. An issue is a Simulink object that is flagged by the Model Advisor check. You see an issue in the check output as a hyperlink and in the Simulink Editor with Model Advisor highlighting.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of issues reported by the Model Advisor for DO-178C/DO-331 checks
- **AggregatedValue:** Number of issues reported by the Model Advisor for DO-178C/DO-331 checks aggregated for a component and all of its subcomponents.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Analyzes the content of library-linked blocks or referenced models if specified.
- Analyzes content in Stateflow objects.
- Does not count checks on the configuration set or issues with data objects.

See Also

- “Collect Model Metric Data”
- “Model Checks for DO-178C/DO-331 Standard Compliance”

Model Advisor Check Issues for Modeling Standards for ISO 26262

Metric Type: Compliance

Metric ID: `mathworks.metrics.ModelAdvisorCheckIssues.ISO26262`

Use this metric to calculate number of issues reported by the group of Model Advisor checks for **Modeling Standards for ISO 26262**. An issue is a Simulink object that the Model Advisor check flags. You see an issue in the check output as a hyperlink and in the Simulink Editor with Model Advisor highlighting.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of issues reported by the Model Advisor for ISO 26262 checks.
- **AggregatedValue:** Number of issues reported by the Model Advisor for ISO 26262 checks aggregated for a component and all of its subcomponents.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Analyzes the content of library-linked blocks or referenced models if specified.
- Analyzes content in Stateflow objects.
- Does not count checks on the configuration set or issues with data objects.

See Also

- “Collect Model Metric Data”
- “Model Checks for IEC 61508, IEC 62304, ISO 26262, and EN 50128 Standard Compliance”

Model Advisor check issues for MAAB Standards

Metric Type: Compliance

Metric ID: `mathworks.metrics.ModelAdvisorCheckIssues.maab`

Use this metric to calculate number of issues reported by the group of Model Advisor checks for **Modeling Standards for MAAB**. An issue is a Simulink object that is flagged by the Model Advisor check. You see an issue in the check output as a hyperlink and in the Simulink Editor with Model Advisor highlighting.

Aggregation properties for this metric are set to:

- `slmetric.metric.AggregationMode: Sum`
- `slmetric.metric.AggregateComponentDetails: true`

Results

For this metric, instances of `slmetric.metric.Result` provide the following results:

- **Value:** Number of issues reported by the Model Advisor for MAAB checks.
- **AggregatedValue:** Number of issues reported by the Model Advisor for MAAB checks aggregated for a component and all of its subcomponents.
- **Measures:** Not applicable.

Capabilities and Limitations

The metric:

- Runs on library models.
- Analyzes content in masked subsystems.
- Analyzes the content of library-linked blocks or referenced models if specified.
- Analyzes content in Stateflow objects.
- Does not count checks on the configuration set or issues with data objects.

See Also

- “Collect Model Metric Data”
- “Model Checks for MathWorks Automotive Advisory Board (MAAB) Guideline Compliance”

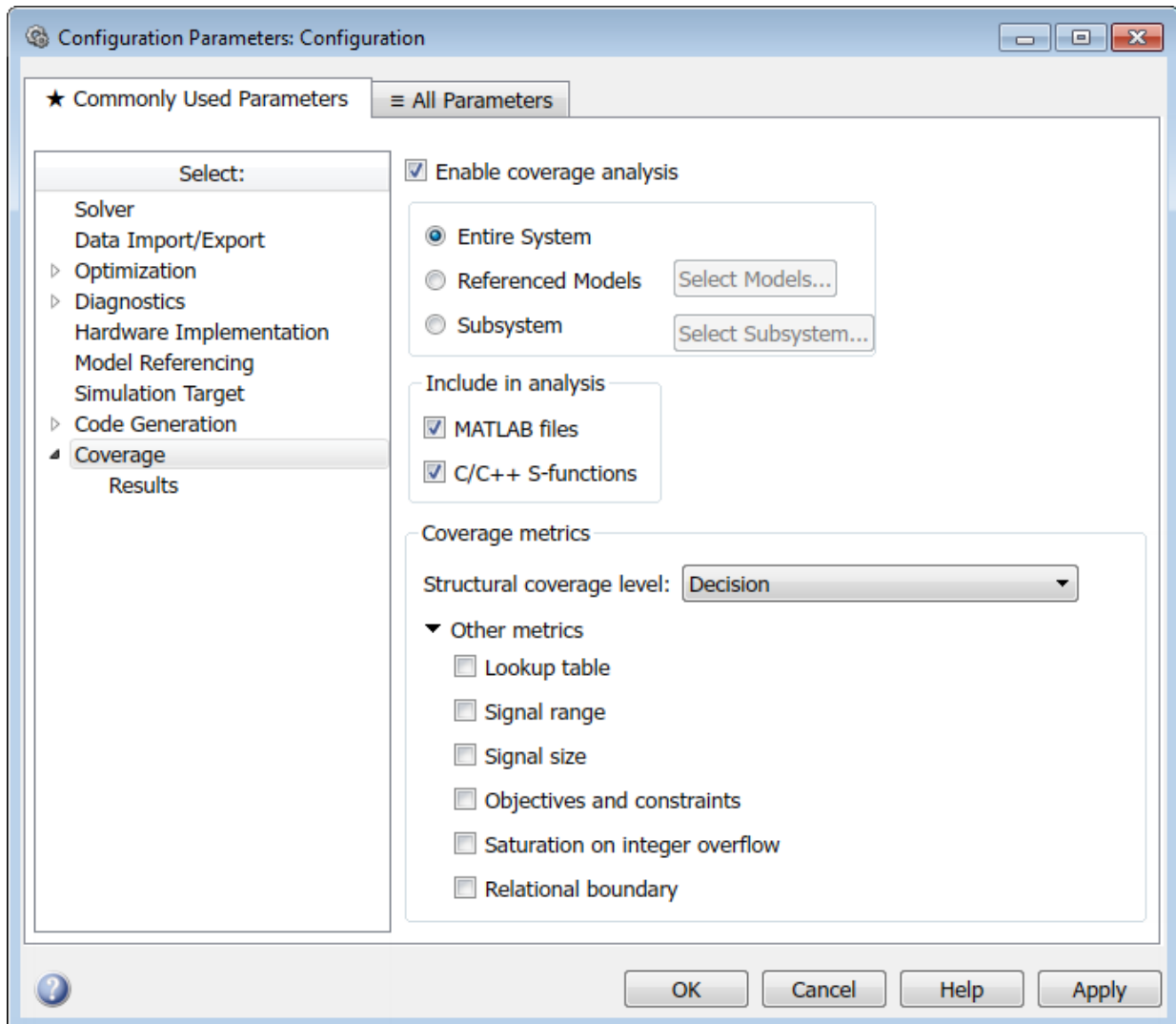
Related Examples

- “Collect Model Metrics Using the Model Advisor”
- “Collect Model Metrics Programmatically”

- “Model Metric Data Aggregation”
- “Create a Custom Model Metric”

Simulink Coverage Settings

Coverage Pane



In this section...

“Coverage Pane Overview” on page 4-5

In this section...

“RecordCoverage” on page 4-6

“CovPath” on page 4-8

“CovCompData” on page 4-9

“CovMetricSettings” on page 4-10

“CovSaveOutputData” on page 4-12

“Enable Lookup Table metric” on page 4-13

“Enable Signal Range metric” on page 4-14

“Enable Signal Size metric” on page 4-15

“Enable Objectives and Constraints (SLDV) metric” on page 4-16

“Enable Saturation on Integer Overflow metric” on page 4-17

“Enable Relational Boundary metric” on page 4-18

“CovFilter” on page 4-19

“CovHTMLOptions” on page 4-20

“CovForceBlockReductionOff” on page 4-22

“CovEnable” on page 4-23

“CovEnableCumulative” on page 4-24

“CovScope” on page 4-25

“CovIncludeTopModel” on page 4-26

“CovSaveCumulativeToWorkspaceVar” on page 4-27

“CovCumulativeVarName” on page 4-28

“CovCumulativeReport” on page 4-29

“CovReportOnPause” on page 4-30

“CovModelRefEnable” on page 4-31

“CovModelRefExcluded” on page 4-32

“CovExternalEMLEnable” on page 4-33

“CovSFcnEnable” on page 4-34

“CovMetricStructuralLevel” on page 4-35

“CovBoundaryAbsTol” on page 4-36

“CovBoundaryRelTol” on page 4-37

In this section...

“CovMcdcMode” on page 4-38

“CovUseTimeInterval” on page 4-39

“CovStartTime” on page 4-40

“CovStopTime” on page 4-41

“CovLogicBlockShortCircuit” on page 4-42

“CovUnsupportedBlockWarning” on page 4-43

Coverage Pane Overview

Specify Simulink Verification and Validation coverage analysis options.

RecordCoverage

Command-Line Information

| | | |
|----------------|--|----------------|
| RecordCoverage | <p>If RecordCoverage is set to on, Simulink collects and reports model coverage data during simulation. The format of this report is controlled by the values of the following parameters:</p> <p>CovCompData</p> <p>CovCumulativeReport</p> <p>CovCumulativeVarName</p> <p>CovHTMLOptions</p> <p>CovHtmlReporting</p> <p>CovMetricSettings</p> <p>CovModelRefEnable</p> <p>CovModelRefExcluded</p> <p>CovNameIncrementing</p> <p>CovPath</p> <p>CovReportOnPause</p> <p>CovSaveCumulativeTo-WorkspaceVar</p> <p>CovSaveName</p> <p>CovSaveSingleTo-WorkspaceVar</p> | 'on' {'off'} |
|----------------|--|----------------|

| | | |
|--|--|--|
| | <p>If set to off, model coverage data is not collected or reported.</p> <p>Set by Enable coverage analysis on the Coverage pane of the Configuration Parameters dialog box.</p> | |
|--|--|--|

CovPath

Command-Line Information

| | | |
|---------|---|-----------|
| CovPath | Model path of the subsystem for which the Simulink Verification and Validation software gathers and reports coverage data. Set by selecting Enable coverage analysis on the Coverage pane of the Configuration Parameters dialog box and then clicking Select Subsystem . | { ' / ' } |
|---------|---|-----------|

CovCompData

Command-Line Information

| | | |
|-------------|---|---------------------|
| CovCompData | If <code>CovHtmlReporting</code> is set to <code>on</code> and <code>CovCumulativeReport</code> is set to <code>on</code> , this parameter specifies <code>cvdata</code> objects containing additional model coverage data to include in the model coverage report. Set by Additional data to include in report (cvdata objects) on the Reporting pane of the Configuration Parameters dialog box. | <code>{ '' }</code> |
|-------------|---|---------------------|

CovMetricSettings

Command-Line Information

| | | |
|--------------------------|--|---|
| <p>CovMetricSettings</p> | <p>Selects coverage metrics for a coverage report.</p> <p>Enabled by selecting the check box for this coverage metric in the Coverage metrics section of the Simulink Coverage pane of the Configuration Parameters dialog box.</p> <p>Enable options 's' and 'w' by selecting Treat Simulink Logic blocks as short-circuited and Warn when unsupported blocks exist in model, respectively, on the Options pane of the Configuration Parameters dialog box.</p> <p>Disable option 'e' by selecting Display coverage results using model coloring on the Results pane of the Configuration Parameters dialog box.</p> | <p>{ 'dw' }</p> <p>Each order-independent character enables a coverage metric or option as follows:</p> <ul style="list-style-type: none"> • 'd' — Enable decision coverage • 'c' — Enable condition coverage • 'm' — Enable MCDC coverage • 't' — Enable lookup table coverage • 'r' — Enable signal range coverage • 'z' — Enable signal size coverage • 'o' — Enable coverage for Simulink Design Verifier blocks • 'i' — Enable saturation on integer overflow coverage • 'b' — Enable relational boundary coverage • 's' — Treat Simulink logic blocks as short-circuited • 'w' — Warn when unsupported blocks exist in model |
|--------------------------|--|---|

| | | |
|--|--|---|
| | | <ul style="list-style-type: none">• 'e' — Eliminate model coloring for coverage results |
|--|--|---|

CovSaveOutputData

Option to automatically save coverage data results to file. Takes the following inputs:

{'on'} | 'off'

Enable Lookup Table metric

Enables the Lookup Table metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Signal Range metric

Enables the Signal Range metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Signal Size metric

Enables the Signal Size metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Objectives and Constraints (SLDV) metric

Enables the Objectives and Constraints (SLDV) metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Saturation on Integer Overflow metric

Enables the Saturation on Integer Overflow metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

Enable Relational Boundary metric

Enables the Relational Boundary metric for coverage recording. For more information, see “Types of Model Coverage”.

Enabled by selecting the check box for this coverage metric in the **Coverage metrics** section of the **Simulink Coverage** pane of the Configuration Parameters dialog box.

CovFilter

The full path of the filter file that specifies model objects that you want to exclude from model coverage collection during simulation. You can only use files that have the valid .cvf filter file format.

CovHTMLOptions

Command-Line Information

| | | |
|-----------------------|--|--|
| <p>CovHTMLOptions</p> | <p>If CovHtmlReporting is set to on, use this parameter to select from a set of display options for the resulting model coverage report.</p> <p>Select these options in the Reporting tab of the Configuration Parameters dialog box.</p> | <p>Appended character sets separated by a space. HTML options are enabled or disabled through a value of 1 or 0, respectively, in the following character sets (default values shown):</p> <ul style="list-style-type: none"> • ' -sRT=1 ' — Show report • ' -sVT=0 ' — Web view mode • ' -aTS=1 ' — Include each test in the model summary • ' -bRG=1 ' — Produce bar graphs in the model summary • ' -bTC=0 ' — Use two color bar graphs (red, blue) • ' -hTR=0 ' — Display hit/count ratio in the model summary • ' -nFC=0 ' — Do not report fully covered model objects • ' -scm=1 ' — Include cyclomatic complexity numbers in summary • ' -bcm=1 ' — Include cyclomatic complexity numbers in block details |
|-----------------------|--|--|

| | | |
|--|--|--|
| | | <ul style="list-style-type: none">• '-xEv=0' — Filter Stateflow events from report |
|--|--|--|

CovForceBlockReductionOff

Command-Line Information

| | | |
|----------------------------|--|------------------|
| CovForceBlock-ReductionOff | If CovForceBlock-ReductionOff is set to on, the Simulink Verification and Validation software ignores the value of the Simulink Block reduction parameter. The software provides coverage data for every block in the model that collects coverage. | { 'on' } 'off' |
|----------------------------|--|------------------|

CovEnable

Enables coverage analysis. For more information, see “Specify Coverage Options”.

CovEnableCumulative

Accumulates model coverage results from successive simulations. Set this and `CovSaveCumulativeToWorkspaceVar` to on to collect model coverage results for multiple simulations in one `cvdata` object. For more information, see “Cumulative Coverage Data”.

CovScope

Command-Line Information

| | | |
|----------|---|--|
| CovScope | Determines the scope of coverage analysis. If set to EntireSystem , the coverage results include the entire system. If set to ReferencedModels , the coverage results only include the referenced models selected in the Select Models for Coverage Analysis dialog box. If set to Subsystem , the coverage results include the subsystems selected in the Subsystem Selection . | character array — {'EntireSystem'} 'ReferencedModels' 'Subsystem' |
|----------|---|--|

CovIncludeTopModel

Enable coverage analysis for the top-level model when recording coverage for referenced models. Enabled when CovScope is For more information, see “Specify Coverage Options”.

CovSaveCumulativeToWorkspaceVar

Command-Line Information

| | | |
|----------------------------------|--|------------------|
| CovSaveCumulativeTo-WorkspaceVar | If set to on , the Simulink Verification and Validation software accumulates and saves the results of successive simulations in the workspace variable specified by CovCumulativeVarName . Set by Save cumulative results in workspace variable on the Results pane of the Configuration Parameters dialog box. | { 'on' } 'off' |
|----------------------------------|--|------------------|

CovCumulativeVarName

Command-Line Information

| | | |
|----------------------|--|-----------------------|
| CovCumulativeVarName | <p>If CovSaveCumulativeToWorkspaceVar is set to on, the Simulink Verification and Validation software saves the results of successive simulations in the workspace variable specified by this property.</p> <p>Set by cvdata object name below the selected Save cumulative results in workspace variable check box on the Results pane of the Configuration Parameters dialog box.</p> | {'covCumulativeData'} |
|----------------------|--|-----------------------|

CovCumulativeReport

Command-Line Information

| | | |
|---------------------|--|----------------|
| CovCumulativeReport | <p>If CovHtmlReporting is set to on, this parameter allows the CovCumulativeReport and CovCompData parameters to specify the number of coverage results displayed in the model coverage report.</p> <p>If set to on, the Simulink Verification and Validation software displays the coverage results from successive simulations in the report.</p> <p>If set to off, the software displays the coverage results for the last simulation in the report.</p> <p>Set by the Cumulative runs (on) / Last run (off) options on the Reporting pane of the Configuration Parameters dialog box.</p> | 'on' {'off'} |
|---------------------|--|----------------|

CovReportOnPause

Command-Line Information

| | | |
|------------------|---|------------------|
| CovReportOnPause | Specifies that when you pause during simulation, the model coverage report appears in updated form, with coverage results up to the current pause or stop time. Set by Update results on pause on the Results pane of the Configuration Parameters dialog box. | { 'on' } 'off' |
|------------------|---|------------------|

CovModelRefEnable

Command-Line Information

| | | |
|-------------------|--|--|
| CovModelRefEnable | <p>If CovModelRefEnable is set to on or all, the Simulink Verification and Validation software generates coverage data for all referenced models. If CovModelRefEnable is set to filtered, coverage data is collected for all referenced models except those specified by the parameter CovModelRefExcluded.</p> <p>Set by Referenced Models on the Coverage pane of the Configuration Parameters dialog box.</p> | 'on' {'off'} 'all' 'filtered' |
|-------------------|--|--|

CovModelRefExcluded

Command-Line Information

| | | |
|---------------------|---|--------|
| CovModelRefExcluded | If CovModelRefEnable is set to filtered , this parameter stores a comma-separated list of referenced models for which coverage is disabled. Set by selecting Referenced Models on the Coverage pane of the Configuration Parameters dialog box and then clicking Select Models . | { '' } |
|---------------------|---|--------|

CovExternalEMLEnable

Command-Line Information

| | | |
|----------------------|--|----------------|
| CovExternalEMLEnable | Enables coverage for external MATLAB functions that MATLAB functions for code generation call in your model. The functions can be defined in a MATLAB Function block or in a Stateflow chart. Enable this feature by checking Coverage for MATLAB Files on the Configuration Parameters dialog box. | 'on' {'off'} |
|----------------------|--|----------------|

CovSFcnEnable

Command-Line Information

| | | |
|---------------|---|----------------|
| CovSFcnEnable | Enables coverage for C/C++ S-Function blocks in your model. Enable this feature by checking Coverage for C/C++ S-Functions on the Configuration Parameters dialog box. For more information, see “Coverage for C and C++ S-Functions” in Simulink Verification and Validation documentation. | 'on' {'off'} |
|---------------|---|----------------|

CovMetricStructuralLevel

Sets the level of structural coverage recorded. For more information, see “Types of Model Coverage”.

CovBoundaryAbsTol

Boundary Tolerance — Absolute

Specifies the value of absolute tolerance for relational boundary coverage of floating point inputs. For more information, see “Relational Boundary Coverage”.

CovBoundaryRelTol

Boundary Tolerance — Relative

Specifies the value of relative tolerance for relational boundary coverage of floating point inputs. For more information, see “Relational Boundary Coverage”.

CovMcdcMode

Definition of Modified Condition Decision Coverage (MCDC) to use during coverage analysis.

To record model coverage using the masking MCDC definition, set `CovMcdcMode` to 'Masking'. To record model coverage using the unique-cause MCDC definition, set `CovMcdcMode` to 'UniqueCause'.

For more information, see “Modified Condition and Decision Coverage (MCDC) Definitions in Simulink Verification and Validation”.

CovUseTimeInterval

Restrict recording to interval

To record model coverage only inside a specified simulation time interval, set `CovUseTimeInterval` to 'on' and define a `CovStartTime` and `CovStopTime`. Model coverage is not recorded for simulation times outside `CovStartTime` and `CovStopTime`. If your simulation starts at a time greater than or equal to `CovStopTime`, model coverage is not recorded.

For example, you might want to restrict model coverage recording if your model has transient effects early in simulation, or if you need model coverage reported only for a particular model operation.

CovStartTime

Coverage Start Time

To record model coverage only inside a specified simulation time interval, set `CovUseTimeInterval` to 'on' and define a `CovStartTime` and `CovStopTime`. Model coverage is not recorded for simulation times outside `CovStartTime` and `CovStopTime`. If your simulation starts at a time greater than or equal to `CovStopTime`, model coverage is not recorded.

For example, you might want to restrict model coverage recording if your model has transient effects early in simulation, or if you need model coverage reported only for a particular model operation.

CovStopTime

Coverage Stop Time

To record model coverage only inside a specified simulation time interval, set `CovUseTimeInterval` to 'on' and define a `CovStartTime` and `CovStopTime`. Model coverage is not recorded for simulation times outside `CovStartTime` and `CovStopTime`. If your simulation starts at a time greater than or equal to `CovStopTime`, model coverage is not recorded.

For example, you might want to restrict model coverage recording if your model has transient effects early in simulation, or if you need model coverage reported only for a particular model operation.

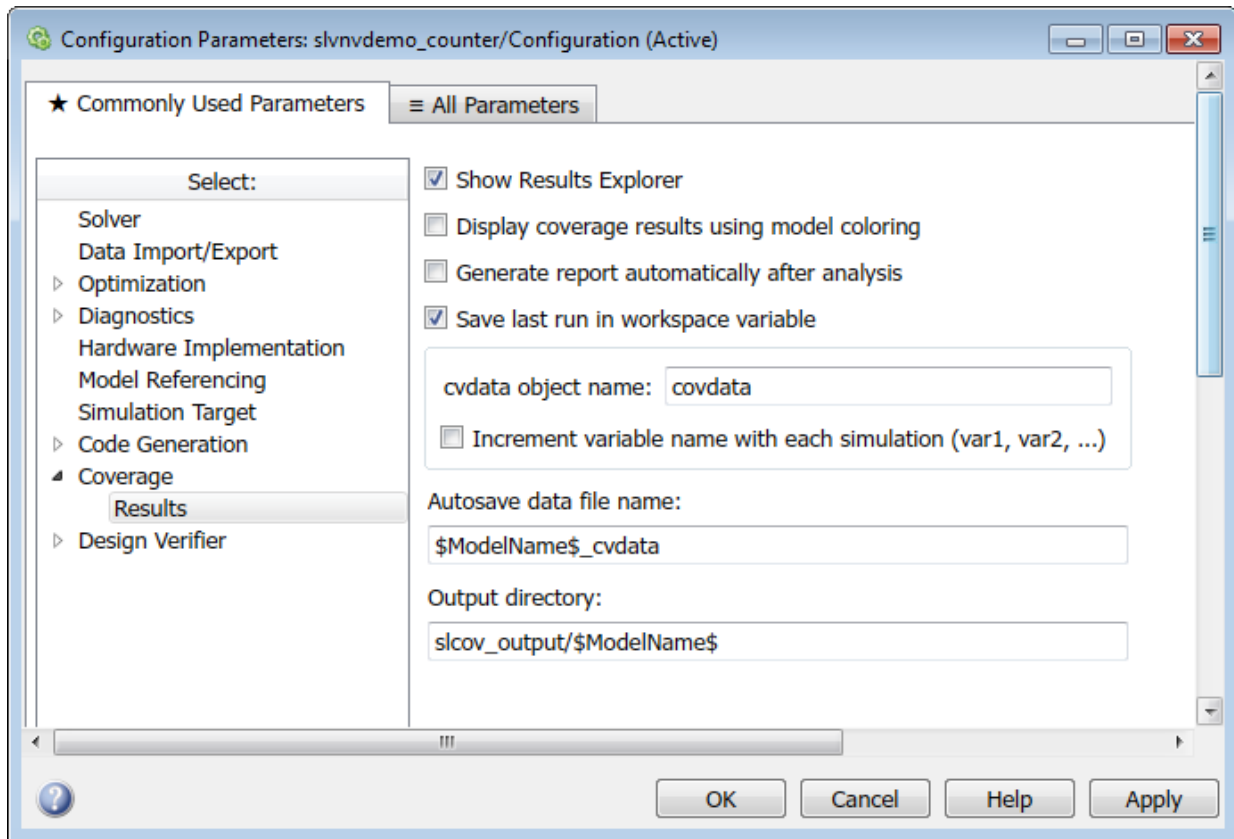
CovLogicBlockShortCircuit

Treat Simulink logic blocks as short-circuited.

CovUnsupportedBlockWarning

Warn when unsupported blocks exist in model.

Coverage Pane: Results



In this section...

“Coverage Results Pane Overview” on page 4-46

“CovShowResultsExplorer” on page 4-47

“CovHighlightResults” on page 4-48

“CovHtmlReporting” on page 4-49

“CovSaveSingleToWorkspaceVar” on page 4-50

“CovSaveName” on page 4-51

“CovNameIncrementing” on page 4-52

In this section...

“CovDataFileName” on page 4-53

“CovOutputDir” on page 4-54

Coverage Results Pane Overview

Specify Simulink Verification and Validation coverage results options.

CovShowResultsExplorer

Option to show the Coverage Results Explorer after simulation. Takes the following inputs:

`{'on'} | 'off'`

CovHighlightResults

Display coverage results using model coloring.

CovHtmlReporting

Command-Line Information

| | | |
|------------------|---|------------------|
| CovHtmlReporting | Set to on to create an HTML report containing the coverage data at the end of simulation. Set by Generate report automatically after analysis on the Reporting pane of the coverage settings. | { 'on' } 'off' |
|------------------|---|------------------|

CovSaveSingleToWorkspaceVar

Command-Line Information

| | | |
|------------------------------|--|------------------|
| CovSaveSingleTo-WorkspaceVar | If set to on , the Simulink Verification and Validation software saves the results of the last simulation run in the workspace variable specified by CovSaveName . Set by Save last run in workspace variable on the Results pane of the Configuration Parameters dialog box. | { 'on' } 'off' |
|------------------------------|--|------------------|

CovSaveName

Name of the `cvdata` object saved in the workspace containing the results of the last simulation run.

CovNameIncrementing

Command-Line Information

| | | |
|---------------------|---|------------------|
| CovNameIncrementing | If set to on , the Simulink Verification and Validation software appends numerals to the workspace variable names for each new result so that earlier results are not overwritten. To enable this parameter, enable CovSaveSingleTo-WorkspaceVar . | { 'on' } 'off' |
|---------------------|---|------------------|

CovDataFileName

Name of file to which coverage data results will automatically be saved.

CovOutputDir

Directory in which coverage output files will be saved.

Model Transformer Tasks

Model Transformer Tasks

In this section...

“Transform the model to variant system” on page 5-2

“1. Identify system constants for use in variant transformation” on page 5-3

“2. Identify blocks that qualify for variant transformation” on page 5-4

“3. Convert blocks to variants” on page 5-4

You can use the Model Transformer tool to refactor a model to implement variants. You can perform the steps in the Model Transformer all at once or one step at a time.

Transform the model to variant system

This folder contains the steps to transform a model to a variant system. The following transformations are possible:

- If an If block connects to one or more If Action Subsystems and each If Action Subsystem has one output, replace this modeling pattern with a subsystem and a Variant Source block.
- If an If block connects to an If Action Subsystem that has no output or two or more outputs, replace this modeling pattern with a Variant Subsystem block.
- If a Switch Case block connects to one or more Switch Case Action Subsystems and each Switch Case Action Subsystem has one output, replace this modeling pattern with a subsystem and a Variant Source block.
- If a Switch Case block connects to a Switch Case Action Subsystem that has no output or two or more outputs, replace this modeling pattern with a Variant Subsystem block.
- Replace a Switch block with a Variant Source block.
- Replace a Multiport Switch block that has two or more data ports with a Variant Source block.

Note: For some model patterns and settings, the Model Transformer cannot perform every one of the preceding transformations.

If you click **Run all**, the Model Transformer performs the three steps in the transformation. The result is a model that contains variant blocks. This model is in the folder that has the prefix `m2m` plus the original model name.

If you want to run every step in the transformation at once, rather than running the steps individually, you can still specify input parameters for those steps that have them.

See Also

- “Transform Model to Variant System”

1. Identify system constants for use in variant transformation

A system constant is the control input or is part of an arithmetic expression that forms the control input to Multiport Switch or Switch blocks and the inputs to If or Switch Case blocks. The control input must be Constant blocks and some combination of blocks that form a supported MATLAB expression. In the Constant block parameters dialog box, the **Constant value** parameters are the system constants. In the transformed model, system constants are part of condition expressions in Variant Source or Variant Subsystem blocks.

When you click **Run This Task**, this step lists system constants that qualify to be part of condition expressions in Variant Source or Variant Subsystem blocks. For a system constant to qualify, it must be a scalar and a `Simulink.Parameter` object with one of these storage classes:

- `Define` with header file specified
- `ImportedDefine` with header file specified
- `CompilerFlag`
- `SystemConstant(AUTOSAR)`
- User-defined custom storage class that defines data as a macro in specified header file

After you run this check, in the results section, you can choose not to use a system constant in the variant transformation by clearing the check box next to it.

See Also

- “Transform Model to Variant System”

2. Identify blocks that qualify for variant transformation

When you click **Run This Task**, in the results section, this step lists modeling patterns that qualify for transformation into Variant Source and Variant Subsystem blocks. Each modeling pattern is a hyperlink to the corresponding location in the model. If you do not want the Model Transformer to perform a transformation, clear the check box next to the qualifying pattern.

See Also

- “Transform Model to Variant System”

3. Convert blocks to variants

When you click **Run This Task**, the Model Transformer creates a model with the blocks that you specified for variant transformation in the preceding step. The transformed model is in the folder that has the prefix `m2m` plus the original model name.

See Also

- “Transform Model to Variant System”

Clone Detection Tasks

Clone Detection Checks

Use the Identify Modeling Clones tool to refactor a model by identifying clones and creating models that replace clones with links to subsystem blocks in a library.

| In this section... |
|--|
| “Identify Exact Clones” on page 6-2 |
| “Identify library clones and replace them with library blocks” on page 6-3 |
| “Identify graphical clones and replace them with library blocks” on page 6-3 |
| “Identify functional clones and replace them with links to library blocks” on page 6-4 |
| “Identify Similar Clones” on page 6-4 |
| “Identify similar library clones” on page 6-5 |
| “Identify similar graphical clones” on page 6-5 |
| “Identify similar functional clones” on page 6-5 |

Identify Exact Clones

This folder contains these checks:

- **Identify library clones and replace them with links to library blocks**
- **Identify graphical clones and replace them with links to library blocks**
- **Identify functional clones and replace them with links to library blocks**

If you click **Run Selected Checks**, the tool performs all three checks and creates models with links to library blocks. The tool identifies clones across referenced model boundaries. The tool identifies library and graphical clones in all model regions including commented-out areas and inactive variants. If you do not want to perform a check, clear the check box next to that check.

Exact clones have identical block types, connections, and parameter values. Exact graphical clones have identical parameter settings and values. Exact functional clones have identical parameter values, but they can have different parameter settings. For example, two Gain blocks can have different `Simulink.Parameters` for the value parameter as long as those parameters evaluate to the same numeric value. Exact clones can have these differences:

- Two clones can have a different sorted order.
- The length of signal lines and the location and size of blocks can be different as long as the block connections are the same.
- Blocks and signals can have different names.

See Also

- “Enable Component Reuse with Clone Detection”

Identify library clones and replace them with library blocks

When you click **Run This Check**, the tool lists modeling patterns that are graphical clones of library subsystems. In the **Library file name** field, you specify a library in which to check a model for clones.

In the modeling patterns list, each clone is a hyperlink to the corresponding location in the model. If you do not want to replace a modeling pattern with a link to a library block, you can clear the check box next to the clone.

When you click **Refactor Model**, the tool creates a model with links to the library blocks. By default, the model name is the prefix `gen1_` plus the original model name. In the input parameters, you can specify another prefix.

See Also

- “Enable Component Reuse with Clone Detection”

Identify graphical clones and replace them with library blocks

When you click **Run This Check**, the tool lists subsystems that are graphical clones. In the list, each subsystem clone is a hyperlink to the corresponding location in the model. If you do not want to replace a subsystem with a link to a library block, you can clear the check box next to the subsystem.

When you click **Refactor Model**, the tool creates a library of subsystem clones and a model with links to these library blocks. By default, the library file name is `graphicalCloneLibFile`. The model name is the prefix `gen2_` plus the original model name. In the input parameters, you can specify another prefix.

See Also

- “Enable Component Reuse with Clone Detection”

Identify functional clones and replace them with links to library blocks

When you click **Run This Check**, the tool lists subsystems that are functional clones. In the list, each subsystem clone is a hyperlink to the corresponding location in the model. If you do not want to replace a subsystem with a link to a library block, you can clear the check box next to the subsystem.

When you click **Refactor Model**, the tool creates a library of subsystem clones and a model with links to these library blocks. By default, the library file name is `functionalCloneLibFile`. The model name is the prefix `gen3_` plus the original model name. In the input parameters, you can specify another prefix.

See Also

- “Enable Component Reuse with Clone Detection”

Identify Similar Clones

This folder contains these checks:

- **Identify similar library clones**
- **Identify similar graphical clones**
- **Identify similar functional clones**

If you click **Run Selected Checks**, the tool performs all three checks. The tool identifies clones across referenced model boundaries. The tool identifies graphical clones in all model regions including commented-out regions and inactive variants. If you do not want to perform a check, clear the check box next to that check.

Similar clones have identical block types and connections, but they can have different parameter settings and values. The check **Identify similar graphical clones** lists similar clones across a model hierarchy including inactive variants and commented-out regions. The check **Identify similar functional clones** lists the same clones as the **Identify similar graphical clones** check excluding those clones in inactive variants and commented-out regions. Similar clones can have these differences:

- Two clones can have a different sorted order.
- The signal line length and location and size of blocks can be different as long as the block connections are the same.
- Blocks and signals can have different names.

See Also

- “Enable Component Reuse with Clone Detection”

Identify similar library clones

When you click **Run This Check**, the tool lists modeling patterns that are similar to library subsystems. The tool checks for similar library clones across a model hierarchy including in inactive variants and commented-out regions. In the **Library file name** field, you specify a library in which to check a model for clones.

In the modeling patterns list, each subsystem clone is a hyperlink to the corresponding location in the model.

See Also

- “Enable Component Reuse with Clone Detection”

Identify similar graphical clones

When you click **Run This Check**, the tool lists subsystems that are similar graphical clones. The tool checks for similar graphical clones across a model hierarchy including in inactive variants and commented-out regions.

In the subsystems list, each subsystem clone is a hyperlink to the corresponding location in the model.

See Also

- “Enable Component Reuse with Clone Detection”

Identify similar functional clones

When you click **Run This Check**, the tool lists subsystems that are functional clones. This check lists the same clones as the check **Identify similar graphical clones** lists excluding those clones in inactive variants and commented-out regions. In the list, each subsystem clone is a hyperlink to the corresponding location in the model.

See Also

- “Enable Component Reuse with Clone Detection”

