

Simulink® Coverage™

Reference



MATLAB® & SIMULINK®

R2020b



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Simulink® Coverage™ Reference

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Functions

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 or strings 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 or strings 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 or string

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 or strings

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')
```

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

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

Examples

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

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

Alternatives

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

- 1 Open the model.
- 2 In the Simulink Editor, select **Model Settings** on the **Modeling** tab.
- 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
slObj	Handle to a Simulink API object
sfID	Stateflow ID
sfObj	Handle to a Stateflow API object
{BlockPath, sfID}	Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart
{BlockPath, sfObj}	Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart

{BlockHandle, sfID} Cell array with a handle to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

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

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

ignore_descendants

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

1 to ignore coverage of descendant objects

0 (default) to collect coverage of descendant objects

Output Arguments

coverage

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

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

description

A structure array with the following fields:

text	Description of the condition measured
condition	A structure array containing condition info for individual condition outcomes
isFiltered	Whether the block is filtered
filterRationale	The filtering rationale
justifiedCoverage	The justified coverage conditions
isJustified	Whether the block is justified

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 **Model Settings** on the **Modeling** tab.
- 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 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 6 Simulate the model by clicking the **Run** button and review the results.

See Also

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

Topics

“Condition Coverage (CC)”

Introduced in R2006b

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

<code>allNames</code>	Get names of all models associated with <code>cvdata</code> objects in <code>cv.cvdatagroup</code>
<code>allSimulationModes</code>	Get names of all simulation modes associated with <code>cvdata</code> objects in <code>cv.cvdatagroup</code>
<code>get</code>	Get <code>cvdata</code> object
<code>getAll</code>	Get all <code>cvdata</code> objects

Properties

`name` `cv.cvdatagroup` object name

Copy Semantics

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

cv.cvdatagroup

Class: cv.cvdatagroup

Package: cv

Create collection of cvdata objects for model reference hierarchy

Syntax

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

Description

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

Examples

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

```
%% Record coverage data for 'sf_car' as cvdata object
model_1 = 'sf_car';
open_system(model_1)
cvdo1 = cvsim(model_1);

%% Record coverage data for 'sf_abs' as cvdata object
model_2 = 'sf_abs';
open_system(model_2)
cvdo2 = cvsim(model_2);

%% Add the two cvdata objects to a cv.cvdatagroup class instantiation
cvdg = cv.cvdatagroup(cvdo1, cvdo2);
```


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 or strings 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 or strings 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 or string

Model with which simulation modes are associated.

Output Arguments

simModes — Simulation modes

cell array of character vectors or strings

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.

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

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,...,cvdoN)
cvhtml(file,cvdo1,...,cvdoN,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,...,cvdoN)` 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,...,cvdoN,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`.

Examples

Create a Coverage Report

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);
```

Input Arguments

cvdo — Coverage data object

Coverage data, specified as a `cvdata` object or `cv.cvdatagroup` object.

file – HTML file name

character array | string array

HTML file name, specified as a character or string array. You can specify the absolute path or relative path and the HTML file where cvhtml stores the report.

options – Report options

character array | string array

Reporting options, specified as a character or string array.

- 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 or string 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
-xEM	Exclude execution metric details from report	off
-nFC	Exclude fully covered model objects from report	off
-nFD	Exclude fully covered model object details from report	on
-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 array | string array

Simulation mode, specified as a character or string array. 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.

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 **Model Settings** on the **Modeling** tab.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 5 Simulate the model by clicking the **Run** button and review the generated report.

See Also

`cv.cvdatabgroup` | `cvmodelview` | `cvsim`

Topics

"Automating Model Coverage Tasks"

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.
- Starting in R2020b, you can load coverage data from previous releases. Coverage data as far back as R2017b is supported. You can aggregate coverage data from two or more `cvdata` objects if the `dbVersion` properties match.

Examples

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

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

See Also

`cvdata` Properties | `cvsave`

Topics

“Retrieve Coverage Details from Results”

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 — Coverage data

object

Coverage data, specified as a `cvdata` object or `cv.cvdatagroup` object.

simMode — Simulation mode

character array | string array

Simulation mode, specified as a character or string array. 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

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

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



```
data = cvsims(testObj)
cvmodelview(data)
```

Alternatives

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

- 1 Open the model.
- 2 Select **Model Settings** on the **Modeling** tab.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 5 Simulate the model by clicking the **Run** button and review the results.

See Also

cvhtml | cvsims

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 or string 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

This example shows how to save coverage data to a file.

Move the current MATLAB® directory to the location that contains the example files.

```
openExample('slcoverage/SaveCoverageResultsExample')
```

Start by loading the model into memory.

```
modelName = 'slvndemo_cv_small_controller';  
load_system(modelName);
```

Simulate the model with the coverage settings that are saved with the model. If you have not set coverage settings, then `cvsim` uses the default settings.

```
covData = cvsim(modelName);
```

Save a coverage data file called **coverage_data**, containing the coverage data in the `covData` object **covData**.

```
cvsave('coverage_data', covData);
```

Save Cumulative Coverage Data to a File

This example shows how to save more than one coverage data object to a single coverage data file.

Move the current MATLAB® directory to the location that contains the example files.

```
openExample('slcoverage/SaveCumulativeCoverageDataToFileExample')
```

Load the model

First, load the model into memory.

```
modelName = 'slvndemo_ratelim_harness';  
load_system(modelName);
```

Set model parameters for coverage

Create a `Simulink.SimulationInput` object to set coverage parameters.

```
covSet = Simulink.SimulationInput(modelName);  
covSet = covSet.setModelParameter('CovEnable', 'on');  
covSet = covSet.setModelParameter('CovMetricStructuralLevel', 'MCDC');  
covSet = covSet.setModelParameter('CovScope', 'Subsystem');  
covSet = covSet.setModelParameter('CovPath', '/Adjustable Rate Limiter');  
covSet = covSet.setModelParameter('CovSaveSingleToWorkspaceVar', 'on');
```

Simulate the model to collect coverage data

Load the data files and then simulate the model to collect two sets of coverage data.

```
load within_lim.mat  
covSet = covSet.setModelParameter('CovSaveName', 'covData1');  
simOut1 = sim(covSet);
```

Now simulate the model a second time using the second data file.

```
load rising_gain.mat
covSet = covSet.setModelParameter('CovSaveName','covData2');
simOut2 = sim(covSet);
```

Save the coverage data to a file

Save the results in a cell array.

```
cov_results{1} = covData1;
cov_results{2} = covData2
```

```
cov_results =
    1x2 cell array
    {1x1 cvdata}  {1x1 cvdata}
```

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 **Model Settings** on the **Modeling** tab.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 In the **Results** section, 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 by clicking the **Run** button and review the results.

See Also

Simulink.SimulationInput | cvload

Topics

“Automating Model Coverage Tasks”

Introduced before R2006a

cvsim

Simulate and return model coverage results for test objects

Syntax

```
cvdo = cvsim(modelName)
cvdo = cvsim(testObj)
[cvdo,simOut] = cvsim(__,Name,Value)
[cvdo,simOut] = cvsim(testObj,paramStruct)
[cvdo1,...,cvdoN] = cvsim(testObj1,...,testObjN)
```

Description

`cvdo = cvsim(modelName)` simulates the model and returns the coverage results in the `cvdata` object, `cvdo`.

`cvdo = cvsim(testObj)` simulates the model and returns the coverage results for the `cvtest` object, `testObj`.

`[cvdo,simOut] = cvsim(__,Name,Value)` specifies the model parameters, simulates the model, and returns the coverage results in the `cvdata` object, `cvdo`, and the simulation outputs in the `Simulink.SimulationOutput` object, `simOut`.

Note `cvsim` ignores model parameters listed in the **Coverage** pane of the Configuration Parameters window. Create a `cvtest` object to set coverage options, or use `sim` instead.

`[cvdo,simOut] = cvsim(testObj,paramStruct)` sets the model parameters specified in a structure `paramStruct`.

`[cvdo1,...,cvdoN] = cvsim(testObj1,...,testObjN)` simulates the model for `N` test objects, and returns the coverage results for each object.

Note `cvsim` will record coverage even if coverage is not enabled in the model parameters.

Examples

Record Coverage Data

This example shows how to use `cvsim` with a `cvtest` object input and a `paramStruct` structure to modify model parameters.

Open the `sldemo_engine` example model.

```
modelName = 'sldemo_engine';
open_system(modelName);
```

Create a test object and turn on decision coverage.

```
testObj = cvtest(modelName);
testObj.settings.decision = 1;
```

Create a structure that defines the following model parameters:

- Set the absolute tolerance, `AbsTol`, to `1e-5`.
- Enable the simulation to save states to the workspace with `SaveState`.
- Declare the variable name to save the state information in with `SaveStateName`.
- Enable Simulink to save simulation output data to the workspace with `SaveOutput`.
- Declare the variable name in which to store the simulation output data with `OutputSaveName`.

```
paramStruct.AbsTol           = '1e-5';
paramStruct.SaveState        = 'on';
paramStruct.StateSaveName    = 'xoutNew';
paramStruct.SaveOutput       = 'on';
paramStruct.OutputSaveName   = 'youtNew';
```

Simulate the model with `cvsim` and generate a coverage report with `cvhtml`.

```
[cvdo,simOut] = cvsim(testObj,paramStruct);
cvhtml('CoverageReport.html', cvdo);
```

Input Arguments

modelName — Name of Simulink model

character array | string array

Name of a Simulink Model, specified as a character array or string array. `cvsim` simulates the model with the current coverage settings.

Data Types: `char` | `string`

testObj — Coverage test settings

`cvtest` object

Coverage test settings, specified as a `cvtest` object. `cvsim` collects coverage using the settings specified in `testObj`.

Data Types: `cvtest`

paramStruct — Model parameters

structure

Model parameters, specified as a structure. You can specify model parameters as a structure and use the structure instead of name-value pair arguments to set multiple parameters.

`paramStruct` fields are the names of model parameters and the values are the corresponding parameter values.

Example: `paramStruct.AbsTol = '1e-5';`

Data Types: `struct`

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

Example: `[cvdo, simOut] = cvsim(testObj, 'AbsTol', '1e-5');` specifies that the model is simulated using an absolute tolerance of $1e-5$ with coverage settings specified in `testObj`.

`cvsim` supports all model parameters that are supported by `sim`, except for parameters in the **Coverage** pane of the Configuration Parameters window.

ModelParameter — Model parameter and value

character array | string array

Name of a model parameter, specified as a character array or string array. The value of the parameter is specified as the next argument.

Data Types: `char` | `string`

Output Arguments

cvdo — Coverage data object

`cvdata`

`cvdo`, returned as a `cvdata` object. When recording coverage for multiple models in a hierarchy, `cvdo` is a `cv.cvdatagroup` object instead. `cvdo` contains the coverage data from the simulated system.

See “Evaluate Coverage Results” for a list of `info` functions.

See `cvdata` Properties for the object structure.

simOut — Simulation data object

`Simulink.SimulationOutput`

`simOut`, returned as a `Simulink.SimulationOutput` object.

See Also

`cv.cvdatagroup` | `cvdata` Properties | `cvhtml` | `cvtest` | `sim`

Introduced before R2006a

cvtest

Create model coverage test specification object

Description

Use `cvtest` to create a test specification object that stores model coverage settings. Pass the `cvtest` object to the `cvsim` function to execute coverage analysis based on your settings.

Creation

Syntax

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

Description

`cvto = cvtest(root)` creates a `cvtest` object with default coverage settings. `root` can be the name of a model or the handle to a model. `root` can also be the name or handle to a subsystem within the model, in which case only the specified subsystem and its descendents are analyzed for coverage.

`cvto = cvtest(root,label)` creates a `cvtest` object with the designated label.

`cvto = cvtest(root,label,setupCmd)` creates a `cvtest` object with the setup command `setupCmd`. The setup command is executed in the base MATLAB workspace before running coverage analysis.

Input Arguments

root — Name or handle of model or path to subsystem

character array | string array

Model name or handle, or path to a subsystem, specified as a character array or string array.

Properties

id — Internal Model ID

scalar

This property is read-only.

Internal model ID, returned as a scalar.

modelcov — Internal Coverage Configuration ID

scalar

This property is read-only.

Internal coverage configuration ID, returned as a scalar.

rootPath — Name or handle of system to analyze

character array | string array

This property is read-only.

Name of the system you specified to analyze, returned as a character array or string array.

Data Types: char | string

label — Test label

character array | string array

Test label, specified as a character array or a string array. This label appears in the coverage report as the test name.

Data Types: char | string

setupCmd — Command executed in base MATLAB workspace before simulation

character array | string array

Command executed in base MATLAB workspace before simulation, specified as a character array or string array.

The setup command is executed before each simulation.

Data Types: char | string

settings — Coverage settings

structure

Types of coverage to collect, specified as a structure.

settings includes the following fields:

Property	Description	Values
settings.decision	Enable decision coverage data.	1 (default) 0
settings.condition	Enable condition coverage data.	1 0 (default)
settings.mcdc	Enable modified condition decision coverage (MCDC) data. If settings.mcdc is enabled, you can also choose which definition of MCDC to use with the options.mcdcmode property.	1 0 (default)
settings.designverifier	Enable coverage data from Simulink Design Verifier™ blocks.	1 0 (default)

Property	Description	Values
<code>settings.tableExec</code>	Enable coverage data for lookup tables.	1 0 (default)
<code>settings.sigrange</code>	Enable signal range data.	1 0 (default)
<code>settings.sigsize</code>	Enable signal size data.	1 0 (default)
<code>settings.overflowsaturation</code>	Enable saturation on integer overflow coverage data.	1 0 (default)
<code>settings.relationalop</code>	<p>Enable relational boundary coverage data.</p> <p>Use <code>options.covBoundaryRelTol</code> and <code>options.covBoundaryAbsTol</code> to specify tolerances for this type of coverage.</p> <p>For more information, see “Relational Boundary Coverage”</p>	1 0 (default)

options — Advanced coverage options

structure

Advanced coverage options, specified as a structure.

`options` includes the following fields:

Property	Description	Values
<code>options.covBoundaryRelTol</code>	<p>Relative tolerance for relational boundary coverage.</p> <p>For more information, see “Relational Boundary Coverage”.</p>	0.01 (default) scalar
<code>options.CovBoundaryAbsTol</code>	<p>Absolute tolerance for relational boundary coverage.</p> <p>For more information, see “Relational Boundary Coverage”.</p>	1e-5 (default) scalar

Property	Description	Values
options.useTimeInterval	<p>Whether to restrict model coverage recording to a specified simulation time interval.</p> <p>Use options.intervalStartTime and options.intervalStopTime to specify the time interval.</p> <p>For more information, see “Specify Coverage Options”</p>	1 0 (default)
options.intervalStartTime	<p>When to start recording coverage.</p> <p>Specify this property if options.useTimeInterval is enabled.</p>	0 (default) scalar
options.intervalStopTime	<p>When to stop recording coverage.</p> <p>Specify this property if options.useTimeInterval is enabled.</p>	0 (default) scalar

Property	Description	Values
<code>options.forceBlockReduction</code>	<p>Whether to record coverage for blocks flagged with the Block Reduction parameter.</p> <ul style="list-style-type: none"> 1 (default) — Override the Simulink Block Reduction parameter if it is enabled. Coverage is recorded for every supported block in the model. The value of the configuration parameter Block Reduction is ignored. 0 — Use the value for the configuration parameter Block Reduction. If Block Reduction is enabled, coverage is not recorded for blocks that are effectively removed from the model because of block reduction. For instance, coverage is not recorded for a block that is reduced by dead code elimination. <p>For more information, see “Block reduction”</p>	1 (default) 0
<code>options.mcdcMode</code>	<p>Which MCDC definition to apply to the model, specified as one of the following options:</p> <ul style="list-style-type: none"> 'masking' — Use the masking definition of MCDC coverage. 'unique cause' — Use the unique cause definition of MCDC coverage. <p>For more information, see “Modified Condition and Decision Coverage (MCDC) Definitions in Simulink Coverage”.</p>	'masking' (default) 'unique cause'

filter — Coverage filter structure

Coverage filter, specified as a structure.

`filter` has one field, `filter.fileName`. `filter.fileName` is the name of a coverage filter file to apply to coverage analysis, specified as a character array or string array.

For more information, see “Coverage Filter Rules and Files”

modelRefSettings — Model reference settings

structure (default)

Model reference settings, specified as a structure.

modelRefSettings includes the following fields:

Property	Description	Values
modelRefSettings.enable	<p>Model reference coverage setting, specified as one of the following options:</p> <ul style="list-style-type: none"> 'off' — Disable coverage for all referenced models. 'all' or 'on' — Enable coverage for all supported referenced models. 'filtered' — Enable coverage for all supported referenced models except those listed in the excludedModels field. 	'off' (default) 'on' 'all' 'filtered'
modelRefSettings.excludeTopModel	Whether to exclude the top model from coverage analysis, specified as a numeric or logical 1 (true) or 0 (false).	1 (default) 0
modelRefSettings.excludeModels	<p>Referenced models to exclude from coverage analysis, specified as a single character or string array of comma-separated model names.</p> <p>To use this field, set modelRefSettings.enable to 'filtered'.</p>	char string

emlSettings — Whether to collect coverage for external program files called by MATLAB functions

structure

Whether to collect coverage for external program files called by MATLAB functions in your model, specified as a structure.

emlSettings has one field, emlSettings.enableExternal. emlSettings.enableExternal is whether to collect external program files called by MATLAB functions, specified as a numeric or logical 1 (true)(default) or 0 (false).

sfcnSettings — Whether to collect coverage for C/C++ S-Function blocks

structure (default)

Whether to collect coverage for C/C++ S-Function blocks in your model, specified as a structure.

`sfcnSettings` has one field, `sfcnSettings.enableSfcn`. `sfcnSettings.enableSfcn` is whether to collect coverage S-Function coverage, specified as a logical 1 (true) (default) or 0 (false).

For more information, see S-Function.

Examples

Create cvtest Object

In this example, you create a `cvtest` object for the Adjustable Rate Limiter block in the `slvndemo_ratelim_harness` model. Simulate the model to get decision coverage and saturation on integer overflow coverage data.

Open the `slvndemo_ratelim_harness` model and define the test object using `cvtest`.

```
open_system('slvndemo_ratelim_harness');
testObj = cvtest(['slvndemo_ratelim_harness', ...
    '/Adjustable Rate Limiter']);
testObj.label = 'Gain within slew limits';
```

Add a setup command to `testObj`. The setup command is executed in the base MATLAB workspace before running the coverage analysis. In this case, the setup command loads data into the workspace that is required for the simulation.

```
testObj.setupCmd = ...
    'load slvndemo_ratelim_harness_data.mat';
```

To collect decision coverage and saturation on integer overflow coverage, enable the `decision` and `overflowsaturation` fields in the `settings` structure by setting the fields to 1.

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

Finally, simulate the model with the coverage analysis by providing the `cvtest` object to the `cvsim` function.

```
cvdo = cvsim(testObj);
```

See Also

`cv.cvdatagroup` | `cvsim`

Topics

“Automating Model Coverage Tasks”

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
<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 from a singly instantiated Stateflow chart
<code>{BlockPath, sfID}</code>	Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

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

ignore_descendants

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

Output Arguments

coverage

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

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

description

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

<code>text</code>	Description of the decision measured
<code>decision</code>	Structure array describing individual decisions, including filtering information. <code>decision.outcome</code> is a structure array describing individual decision outcomes, including filtering information for outcomes
<code>isFiltered</code>	Whether the block is filtered
<code>filterRationale</code>	The filtering rationale
<code>justifiedCoverage</code>	The justified decision conditions
<code>isJustified</code>	Whether the block is justified

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 **Model Settings** on the **Modeling** tab.
- 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 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 6 Simulate the model by clicking the **Run** button and review the results.

See Also

[complexityinfo](#) | [conditioninfo](#) | [cvsim](#) | [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
<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 from a singly instantiated Stateflow chart
<code>{BlockPath, sfID}</code>	Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart

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

ignore_descendants

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

Output Arguments

coverage

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

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

description

description is a structure array containing the following fields:

decision.text	Structure array describing block execution counts
isFiltered	Whether the block is filtered
filterRationale	The filtering rationale
justifiedCoverage	The justified decision conditions
isJustified	Whether the block is justified

Examples

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

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

Alternatives

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

- 1 Open the model.
- 2 In the Model Editor, select **Model Settings** on the **Modeling** tab.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Under **Coverage metrics**, select **Block Execution** as the structural coverage level.
- 5 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 6 Simulate the model by clicking the **Run** button and review the results.

See Also

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

Topics

“Execution Coverage (EC)”

Introduced in R2006b

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 or string

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

simMode — Simulation mode

character vector or string

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, 'slvndemo_cv_small_controller');  
get(cvdg, 'slvndemo_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 or string

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.

Examples

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

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

extract

Extract subsystem coverage data from system-level coverage data

Syntax

```
excvd = extract(cvdo, subsystem)
```

Description

`excvd = extract(cvdo, subsystem)` extracts coverage data for `subsystem` from system-level coverage data `cvdo`.

Examples

Create HTML Coverage Report for a Subsystem from Model Coverage Data

Record coverage data for the `sf_car` model.

```
model = 'sf_car'  
open(model)  
cvdo = cvsim(model);
```

Extract the coverage data for the `shift_logic` subsystem from the coverage data from the top-level model `sf_car`.

```
excvd = extract(cvdo, 'sf_car/shift_logic');
```

Create a coverage report from the extracted coverage data.

```
cvhtml('tmp', excvd)
```

Input Arguments

cvdo — System-level coverage data object

object (default)

System-level coverage data object from a top-level model, specified as an object.

Data Types: object

subsystem — Subsystem in a Simulink model

character vector (default)

Full name or path of a subsystem in an open or loaded Simulink model, specified as a character vector.

Data Types: character vector

Output Arguments

excvd — **Extracted coverage data object**

object

Coverage data object for a subsystem extracted from a Simulink model, returned as an object.

See Also

`cv.cvdgroup` | `cvhtml` | `cvsim`

Topics

“Automating Model Coverage Tasks”

Introduced in R2019b

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>slObj</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

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

Default:**metric**

cvmetric.Sldv enumeration object, or a cell array of enumeration objects, with values that correspond to Simulink Design Verifier library blocks. If you don't specify a metric, getCoverageInfo returns coverage information for all available metrics for the specified object.

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

ignore_descendants

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

Output Arguments**coverage**

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

<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.

Note If object receives coverage for multiple metrics, then the output argument coverage is a cell array with each cell corresponding to the objective outcomes for a metric. Each cell contains a two-element vector of the form [*covered_outcomes total_outcomes*].

description

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

Note If object receives coverage for multiple metrics, then the output argument description is a cell array with each cell corresponding to the descriptions for a metric. Each cell contains a structure array containing descriptions of each objective, and descriptions and execution counts for each outcome within object.

Examples

Get coverage for all Proof Objective blocks in Verification Subsystem1

```
mdl = 'sldvdemo_powerwindow_vs';
open_system(mdl)
set_param(mdl, 'StopTime', '10')
testObj = cvtest(mdl);
testObj.settings.designverifier = 1;
data = cvsim(testObj);
verifSubsys = [mdl '/Verification Subsystem1'];
covProof = getCoverageInfo(data, verifSubsys, cvmetric.Sldv.proof)
```

`covProof` is a two-element vector of the form `[covered_outcomestotal_outcomes]` showing 1 covered outcome out of 1 total proof objective outcome.

Get coverage for a specific Test Objective block in Verification Subsystem1

```
mdl = 'sldvdemo_powerwindow_vs';
open_system(mdl)
set_param(mdl, 'StopTime', '10')
testObj = cvtest(mdl);
testObj.settings.designverifier = 1;
data = cvsim(testObj);
verifSubsys = [mdl '/Verification Subsystem1'];
testObjBlock = [verifSubsys '/Test Objective2'];
covTest = getCoverageInfo(data, testObjBlock)
```

`covTest` is a two-element vector of the form `[covered_outcomes total_outcomes]` showing 0 covered outcomes out of 1 total test objective outcome.

Get coverage data and descriptions for all available metrics recorded in Verification Subsystem1

```
mdl = 'sldvdemo_powerwindow_vs';
open_system(mdl)
set_param(mdl, 'StopTime', '10')
testObj = cvtest(mdl);
testObj.settings.designverifier = 1;
data = cvsim(testObj);
verifSubsys = [mdl '/Verification Subsystem1'];
[covAll, descrAll] = getCoverageInfo(data, verifSubsys, ...
{cvmetric.Sldv.proof, cvmetric.Sldv.test})
```

`covAll` is a cell array with cells corresponding to the objective outcomes for each metric. `descrAll` is a cell array with cells corresponding to descriptions of each metric.

```
covAll{1}
covAll{2}
```

`covAll{1}` is a two-element vector of the form `[covered_outcomes total_outcomes]` showing 1 covered outcomes out of 1 total proof objective outcomes. `covAll{2}` is a two-element vector of the form `[covered_outcomes total_outcomes]` showing 0 covered outcomes out of 1 total test objective outcomes.

```
descrAll{1}
descrAll{2}
```


`descrAll{1}` is a structure array containing descriptions of each proof objective, and descriptions and execution counts for each outcome. `descrAll{2}` is a structure array containing descriptions of each test objective, and descriptions and execution counts for each outcome.

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 **Model Settings** on the **Modeling** tab.
- 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](#) | [conditioninfo](#) | [cvsim](#) | [decisioninfo](#) | [mcdcinfo](#) | [overflowsaturationinfo](#) | [sigrangeinfo](#) | [sigsizeinfo](#) | [tableinfo](#)

Topics

“Simulink Design Verifier Coverage”

Introduced in R2009b

mcdcinfo

Retrieve modified condition/decision coverage information from cvdata object

Syntax

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

Description

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

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

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

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

Input Arguments

cvdo

cvdata object

ignore_descendants

Logical value specifying whether to ignore the coverage of descendant objects

1 — Ignore coverage of descendant objects

0 — Collect coverage for descendant objects

object

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

Object Specification	Description
BlockPath	Full path to a model or block
BlockHandle	Handle to a model or block
slObj	Handle to a Simulink API object
sfID	Stateflow ID

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

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.

Object Specification	Description
'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:

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

description

A structure array containing the following fields:

<i>text</i>	Description of the condition/decision measured
<i>condition</i>	A structure array containing condition/decision info for individual condition outcomes
<i>isFiltered</i>	Whether the block is filtered
<i>filterRationale</i>	The filtering rationale
<i>justifiedCoverage</i>	The justified coverage conditions
<i>isJustified</i>	Whether the block is justified

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 **Model Settings** on the **Modeling** tab.
- 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 by clicking the **Run** button and review the results.

See Also

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

Topics

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

Introduced in R2006b

overflowsaturationinfo

Retrieve saturation on integer overflow coverage from cvdata object

Syntax

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

Description

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

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

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

Examples

Extract Saturation on Integer Overflow Data

This example shows how to use `overflowsaturationinfo` to extract saturation on integer overflow data for a MinMax block from a cvdata object.

Move the current MATLAB® directory to the location that contains the example files.

```
openExample('slcoverage/ExtractSaturationOnIntegerOverflowDataExample');
```

Generate coverage data

Open the model and set coverage settings.

```
load_system('slcoverage_fuelsys');
```

Create a Simulink.SimulationInput object to change configuration parameters without modifying the model.

```
covSet = Simulink.SimulationInput('slcoverage_fuelsys');
```

Turn on coverage analysis and configure Simulink® to save the coverage data in a separate cvdata object in the workspace.

```
covSet = covSet.setModelParameter('CovEnable', 'on');
covSet = covSet.setModelParameter('CovSaveSingleToWorkspaceVar', 'on');
```

```
covSet = covSet.setModelParameter('CovSaveName', 'covData');
covSet = covSet.setModelParameter('CovScope', 'EntireSystem');
```

Enable collection of saturation on integer overflow Coverage and simulate the model by calling `sim` with the `SimulationInput` object as the input.

```
covSet = covSet.setModelParameter('CovMetricSaturateOnIntegerOverflow', 'on');
simOut = sim(covSet);
```

Extract saturation on integer overflow results

Get the block handle to the MinMax block using `get_param` and then get the saturation on integer overflow results.

```
blockHandle = get_param(['slcoverage_fuelsys/', ...
    'Engine Gas Dynamics/Mixing & Combustion/MinMax'], 'Handle');
saturationResults = overflowsaturationinfo(covData, blockHandle)
percentSaturationCoverage = 100 * saturationResults(1)/saturationResults(2)
```

```
saturationResults =
```

```
    1    2
```

```
percentSaturationCoverage =
```

```
    50
```

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.

Determine Individual Integer Overflow Outcomes

This example shows how to use `overflowsaturationinfo` to determine whether or not integer overflow occurs for a block in a model.

Move the current MATLAB® directory to the location that contains the example files.

```
openExample('slcoverage/DetermineIndividualIntegerOverflowOutcomesExample');
```

Generate coverage data

Load the `slvndemo_saturation_on_overflow_coverage` example model.

```
load_system('slvndemo_saturation_on_overflow_coverage');
```

Set coverage setting using a `Simulink.SimulationInput` object. Turn coverage on and configure Simulink® to output a `cvdata` object into the workspace.

```
covSet = Simulink.SimulationInput('slvndemo_saturation_on_overflow_coverage');
covSet = covSet.setModelParameter('CovEnable', 'on');
covSet = covSet.setModelParameter('CovSaveSingleToWorkspaceVar', 'on');
covSet = covSet.setModelParameter('CovSaveName', 'covData');
covSet = covSet.setModelParameter('CovScope', 'EntireSystem');
```

Extract saturation on integer overflow results

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

```
covSet = covSet.setModelParameter('CovMetricSaturateOnIntegerOverflow','on');
simOut = sim(covSet);
[covResults, covDesc] = overflowsaturationinfo(covData, ...
    ['slvnvdemo_saturation_on_overflow_coverage/Test Unit /' ...
    'Controller/Sum'])
percentSaturation = 100 * covResults(1)/covResults(2)
```

```
covResults =
```

```
    1    2
```

```
covDesc =
```

```
struct with fields:
```

```
    isFiltered: 0
    isJustified: 0
    justifiedCoverage: 0
    filterRationale: ''
    decision: [1x1 struct]
```

```
percentSaturation =
```

```
    50
```

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.

```
outcome1 = covDesc.decision.outcome(1)
outcome2 = covDesc.decision.outcome(2)
```

```
outcome1 =
```

```
struct with fields:
```

```
    execCount: 3
    executionCount: 3
    text: 'false'
    isFiltered: 0
    isJustified: 0
    filterRationale: ''
    executedIn: []
```

```
outcome2 =
```



```

struct with fields:
    execCount: 0
    executionCount: 0
        text: 'true'
    isFiltered: 0
    isJustified: 0
    filterRationale: ''
    executedIn: []

```

During simulation, integer overflow did *not* occur in the Sum block because the 'true' outcome has an execution count of 0.

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

cvdata object

Coverage results data, specified as a cvdata object.

object — Model or model component

full path | handle

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

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

Example: 'slvndemo_saturation_on_overflow_coverage'

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

ignore_descendants — Preference to ignore coverage of descendant objects

0 (default) | 1

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

1 — Ignore coverage of descendant objects

0 — Collect coverage for descendant objects

Data Types: `logical`

Output Arguments

coverage — Saturation on overflow coverage results for object

numerical vector

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

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

Data Types: `double`

description — Textual description of coverage outcomes

structure array

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

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

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

`decision.isFiltered`

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

`decision.filterRationale`

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

Data Types: struct

See Also

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

Topics

“Command Line Verification Tutorial”
“Saturate on Integer Overflow Coverage”

Introduced in R2013a

relationalboundaryinfo

Retrieve relational boundary coverage from cvdata object

Syntax

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

Description

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

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

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

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

Examples

Collect Relational Boundary Coverage for Supported Block in Model

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

Open the `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
```

```
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
slobj	Handle to a Simulink API object
sfID	Stateflow ID
sfobj	Handle to a Stateflow API object
{BlockPath, sfID}	Cell array with the path to a Stateflow chart or atomic subchart and the ID of an object contained in that chart or subchart
{BlockPath, sfobj}	Cell array with the path to a Stateflow chart or atomic subchart and a Stateflow object API handle contained in that chart or subchart

Object Specification	Description
{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 or string

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 object
<code>total_outcomes</code>	Total number of relational boundary outcomes for object

Data Types: `double`

description — Textual description of coverage outcomes

structure array

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

<code>isFiltered</code>	0 if the model component specified by <code>object</code> is not excluded from coverage recording. 1 if the model component specified by <code>object</code> is excluded from coverage recording. For more information about excluding objects from coverage, see “Coverage Filtering”.
<code>decision.text</code>	Character vector or string of the form: <i>op_1 - op_2</i> <ul style="list-style-type: none">• <i>op_1</i> is the left operand in the relational operation.• <i>op_2</i> is the right operand in the relational operation.

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

Data Types: `struct`

See Also

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

Topics

“Command Line Verification Tutorial”
 “Relational Boundary Coverage”

Introduced in R2014b

sigrangeinfo

Retrieve signal range coverage information from cvdata object

Syntax

```
[min, max] = sigrangeinfo(cvdo, object)
[min, max] = sigrangeinfo(cvdo, object, portID)
```

Description

`[min, max] = sigrangeinfo(cvdo, object)` returns the minimum and maximum signal values output by the model component object within the cvdata object `cvdo`.

`[min, max] = sigrangeinfo(cvdo, object, portID)` returns the minimum and maximum signal values associated with the output port `portID` of the Simulink block object.

Input Arguments

cvdo

cvdata object

object

An object in the model or Stateflow chart that receives signal range coverage. Valid values for `object` include the following:

Object Specification	Description
BlockPath	Full path to a model or block
BlockHandle	Handle to a model or block
slObj	Handle to a Simulink API object
sfID	Stateflow ID
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 a Block

This example shows how to extract signal range info from a coverage data object.

Move the current MATLAB® directory to the location that contains the example files.

```
openExample('slcoverage/CollectSignalRangeDataForABlockExample');
```

Load the model and set up coverage options

Load the model into memory. This example uses a small controller model.

```
modelName = 'slvndemo_cv_small_controller';
load_system(modelName)
```

Declare coverage settings using a structure of parameter names and values. For a complete list of coverage parameters and their possible values, see “Coverage Settings” on page 2-2.

```
covOpts.CovEnable = 'on';
covOpts.CovSaveSingleToWorkspaceVar = 'on';
covOpts.CovSaveName = 'covData';
covOpts.CovMetricSignalRange = 'on';
```

Simulate the model using `sim` with the model name and the parameter structure as inputs.

```
simOut = sim(modelName,covOpts);
```

Get signal range data

Get the block handle of the Product block using `get_param`.

```
bHandle = get_param([modelName, '/Product'], 'Handle');
```

Get the signal range data by calling `sigrangeinfo` with the cvdata object and the block handle as inputs.

```
[minVal, maxVal] = sigrangeinfo(covData,bHandle)
```

```
minVal =
```

```
0
```

```
maxVal =  
    25.0000
```

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 **Model Settings** on the **Modeling** tab.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Under **Coverage metrics**, select **Signal Range**.
- 5 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 6 Simulate the model by clicking the **Run** button and review the results.

See Also

[complexityinfo](#) | [conditioninfo](#) | [cvssim](#) | [decisioninfo](#) | [getCoverageInfo](#) | [mcdcinfo](#) | [overflowsaturationinfo](#) | [sigsizeinfo](#) | [tableinfo](#)

Introduced in R2006b

sigsizeinfo

Retrieve signal size coverage information from cvdata object

Syntax

```
[min, max, allocated] = sigsizeinfo(data, object)
[min, max, allocated] = sigsizeinfo(data, object, portID)
```

Description

`[min, max, allocated] = sigsizeinfo(data, object)` returns the minimum, maximum, and allocated signal sizes for the outputs of model component `object` within the coverage data `object data`, if `object` supports variable size signals.

`[min, max, allocated] = sigsizeinfo(data, object, portID)` returns the minimum and maximum signal sizes associated with the output port `portID` of the model component `object`.

Input Arguments

data

cvdata object

object

An object in the model or Stateflow chart that receives signal size coverage. Valid values for `object` include the following:

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

portID

Output port number of the model component object

Output Arguments

max

Maximum signal size output by the model component `object` within the `cvdata` object data. If `object` has multiple outputs, `max` is a vector.

min

Minimum signal size output by the model component `object` within the `cvdata` object data. If `object` has multiple outputs, `min` is a vector.

allocated

Allocated signal size output by the model component `object` within the `cvdata` object data. If `object` has multiple outputs, `allocated` is a vector.

Examples

Collect signal size coverage data for the Switch block in the `sldemo_varsize_basic` model:

```
mdl = 'sldemo_varsize_basic';
open_system(mdl);
%Create test spec object
testObj = cvtest(mdl);
%Enable signal size coverage
testObj.settings.sigsize=1;
%Simulate the model
data = cvsim(testObj);
%Set the block handle
blk_handle = get_param([mdl, '/Switch'], 'Handle');
%Get signal size data
[minVal, maxVal, allocVal] = sigsizeinfo(data, blk_handle);
```

Alternatives

Use the coverage settings to collect signal size coverage for a model:

- 1 Open the model for which you want to collect signal size coverage.
- 2 In the Simulink Editor, select **Model Settings** on the **Modeling** tab.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Under **Coverage metrics**, select **Signal Size**.
- 5 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 6 Simulate the model by clicking the **Run** button and review the results.

See Also

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

Introduced in R2010b

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 or string

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 or string

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_mdref_conversion');  
newmodel = slvnvextract('sldemo_mdref_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 harness options

structure

Default harness options, returned as a structure. The `harnessopts` structure has 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: <code>true</code>
<code>usedSignalsOnly</code>	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 Coverage Harness with Default Options

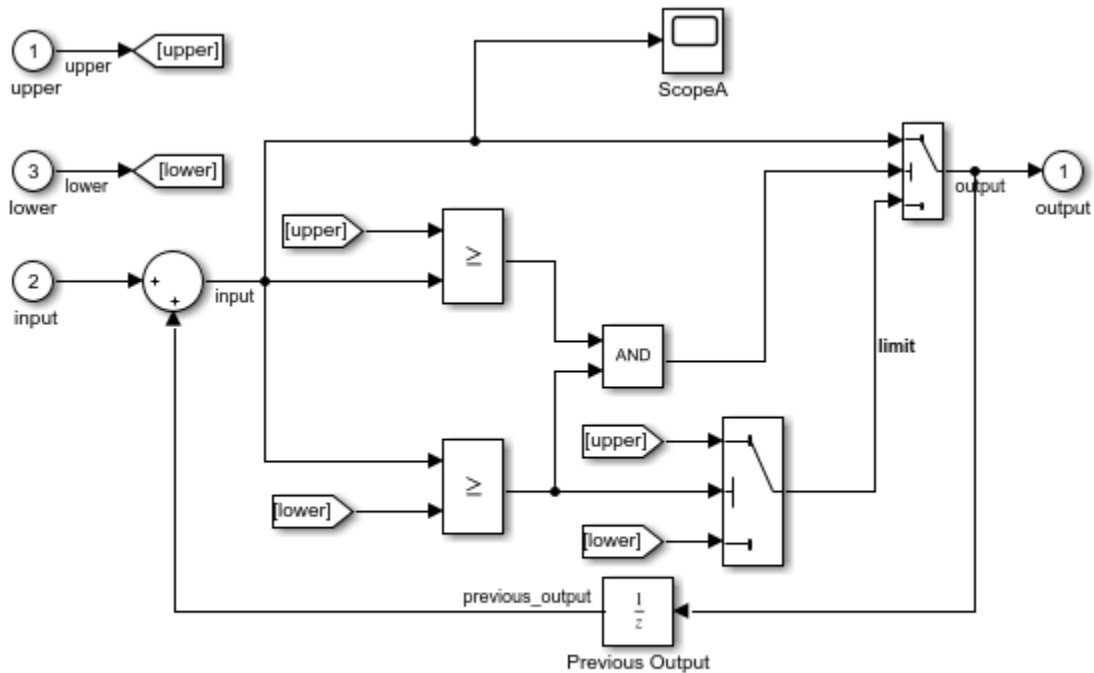
This example shows how to set harness options for a coverage harness.

Move the current MATLAB® directory to the location that contains the example files.

```
openExample('slcoverage/CreateACoverageHarnessWithDefaultOptionsExample');
```

Open the model using `open_system`.

```
open_system('slvndemo_counter')
```



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Create the harness options object using `slvnharnessopts`.

```
harness0pts = slvnharnessopts
```

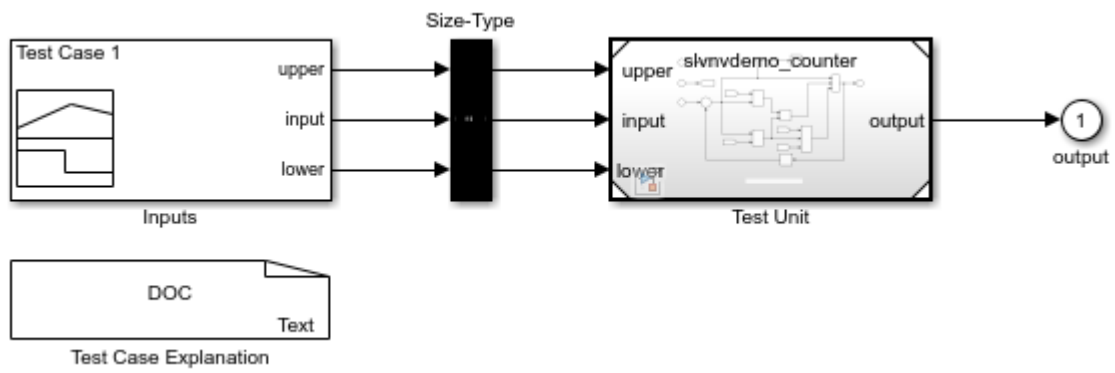
```
harness0pts =
```

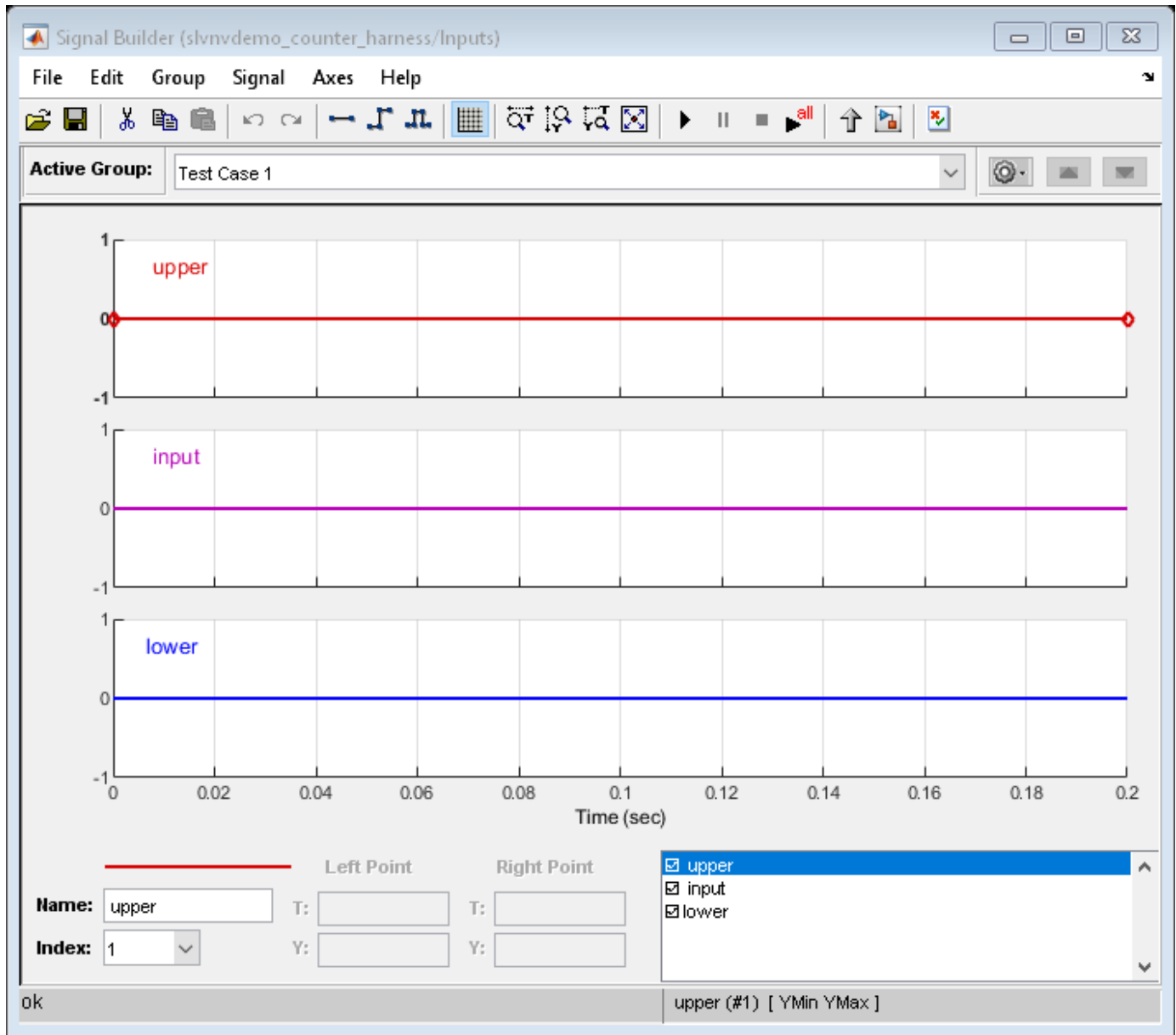
```
struct with fields:
```

```
harnessFilePath: ''
modelRefHarness: 1
usedSignalsOnly: 0
harnessSource: 'Signal Builder'
```

Use the `harness0pts` to create the harness file using `slvnmakeharness`.

```
harnessFile = slvnmakeharness('slvndemo_counter', ...
    '', harness0pts);
```





See Also

slvnmakeharness

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 or string | handle

The full block path name or handle to a Simulink Model block, specified as a character vector or string.

harness_model — Harness name

character vector or string | handle

Name or handle to a harness model that the Simulink Design Verifier software, `sldvmakeharness`, or `slvnlvmakeharness` creates, specified as a character vector or string.

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_mdref_counter model, in the context of the
% sldemo_mdref_basic model and log the data:
open_system('sldemo_mdref_basic');
data = slvnlvsignals('sldemo_mdref_basic/CounterB');

% Create a harness model for sldemo_mdref_counter using the
% logged data and the default harness options:
load_system('sldemo_mdref_counter');
harnessOpts = slvnharnessopts
[harnessFilePath] = ...
    slvnmakeharness('sldemo_mdref_counter', data, ...
    harnessOpts);
```

See Also

[sldvmakeharness](#) | [slvnmakeharness](#) | [slvnruncgvtest](#) | [slvnvrntest](#)

Introduced in R2010b

slvnvmakeharness

Generate Simulink Coverage 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 or string with the model name. `slvnvmakeharness` returns the path and file name of the generated harness model in `harnessFilePath`. `slvnvmakeharness` creates a harness model containing the Model block, a Signal Builder block, and a size-type conversion block, by default. 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 or string | 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>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 or string

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_mdref_house` model using the default options:

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

See Also

`slvnvharnessopts` | `slvnvmergeharness`

Introduced in R2010b

slvnmmergedata

Combine test data from data files

Syntax

```
merged_data = slvnmmergedata(data1,data2,...)
```

Description

`merged_data = slvnmmergedata(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 `slvnmlogsignals` 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_mdref_basic model, which contains three Model blocks
% that reference the sldemo_mdref_counter model:
sldemo_mdref_basic;

% Log the input signals to the three Model blocks:
data1 = slvnmlogsignals('sldemo_mdref_basic/CounterA');
data2 = slvnmlogsignals('sldemo_mdref_basic/CounterB');
data3 = slvnmlogsignals('sldemo_mdref_basic/CounterC');

% Merge the logged data:
merged_data = slvnmmergedata(data1, data2, data3);

% Simulate the referenced model, sldemo_mdref_counter, for coverage with
% the merged data and display the coverage results in an HTML file.
open_system('sldemo_mdref_counter');
runOpts = slvnmruntestopts;
runOpts.coverageEnabled = true;
[ outData, initialCov ] = slvnmruntest('sldemo_mdref_counter', ...
    merged_data, runOpts);
cvhtml('Initial coverage', initialCov);
```

See Also

`sldvrun` | `slvnmlogsignals` | `slvnmmakeharness` | `slvnmruncovertest` | `slvnmruntest`

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 or strings 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 or string

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 or strings

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 or strings

Cell array of character vectors or strings that is the same length as `models`.

Output Arguments

status — Status of data and initialization commands getting saved

1 | 0

`slvnmmergeharness` 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 = slvnlvlogs('sldemo_mdref_basic/CounterA');
data2 = slvnlvlogs('sldemo_mdref_basic/CounterB');
data3 = slvnlvlogs('sldemo_mdref_basic/CounterC');
open_system('sldemo_mdref_counter');

% Make three test harnesses using the logged signals:
harness1FilePath = slvnmmakeharness('sldemo_mdref_counter', data1);
harness2FilePath = slvnmmakeharness('sldemo_mdref_counter', data2);
harness3FilePath = slvnmmakeharness('sldemo_mdref_counter', data3)
[~, harness1] = fileparts(harness1FilePath);
[~, harness2] = fileparts(harness2FilePath);
[~, harness3] = fileparts(harness3FilePath);

% Merge the three test harnesses:
slvnmmergeharness('new_harness_model',{harness1, harness2, harness3});
```

See Also

`slvnlvlogs` | `slvnmmakeharness`

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 or string

Name of the Simulink model that you execute.

dataFile — Input data

structure | character vector or string

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 `slvnvlogsignals` function.

runOpts — Specify the configuration of `slvnvruncgvtest`

structure

The fields of `runOpts` specify the configuration of `slvnvruncgvtest`.

Field Name	Description
<code>testIdx</code>	Test case index array to simulate from <code>dataFile</code> . If <code>testIdx = []</code> (the default), <code>slvnvruncgvtest</code> simulates all test cases.

Field Name	Description
allowCopyModel	<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> <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>
cgvCompType	<p>Defines the software-in-the-loop (SIL) or processor-in-the-loop (PIL) approach for CGV:</p> <ul style="list-style-type: none"> • 'topmodel' (default) • 'modelblock'
cgvConn	<p>Specifies mode of execution for CGV:</p> <ul style="list-style-type: none"> • 'sim' (default) • 'sil' • 'pil'

Note `runOpts = slvnvruntestopts('cgv')` returns a `runOpts` structure with the default values for each field.

Output Arguments

cgvObject – 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

Field	Description
logout_slvnvruncgvtest	Signal logging data for: <ul style="list-style-type: none"> • Signals connected to outputs • 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 = slvnvruntestopts('cgv');
runOpts.allowCopyModel = true;

% Using the logged signals, execute slvnvruncgvtest – first in simulation mode, and then in
% Software-in-the-Loop (SIL) mode – to invoke the CGV API and execute the specified test
% cases on the generated code for the model:
cgvObjectSim = slvnvruncgvtest('sldemo_mdref_counter', loggedData, runOpts);
runOpts.cgvConn = 'sil';
cgvObjectSil = slvnvruncgvtest('sldemo_mdref_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 `slvnvruncgvtest`, you must have the Embedded Coder® software.

If your model has parameters that are not configured for executing test cases with the CGV API, `slvnvruncgvtest` reports warnings about the invalid parameters. If you see these warnings, do one of the following:

- Modify the invalid parameters and rerun `slvnvruncgvtest`.
- Set `allowCopyModel` in `runOpts` to be true and rerun `slvnvruncgvtest`. `slvnvruncgvtest` makes a copy of your model configured for executing test cases, and invokes the CGV API.

See Also

`cgv.CGV` | `slvnvlogsignals` | `slvnvruntest` | `slvnvruntestopts`

Introduced in R2010b

slvnvrntest

Simulate model by using input data

Syntax

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

Description

`outData = slvnvrntest(model, dataFile)` simulates `model` by using all the test cases in `dataFile`. `outData` is an array of `Simulink.SimulationOutput` objects. Each array element contains the simulation output data of the corresponding test case.

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

`[outData, covData] = slvnvrntest(model, dataFile, runOpts)` simulates `model` by using the test cases in `dataFile`. When the `runOpts` field `coverageEnabled` is true, the Simulink Coverage™ software collects model coverage information during the simulation. `slvnvrntest` returns the coverage data in the `cvdata` object `covData`.

Input Arguments

model — Simulink model that you simulate

character vector or string | handle

The Simulink model to simulate.

dataFile — Input data

character vector or string | 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 `slvnvlogsigs` 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>

Field	Description
coverageEnabled	If <code>true</code> , specifies that the Simulink Coverage software collects model coverage data during simulation. Default: <code>false</code>
coverageSetting	<code>cvtest</code> object for collecting model coverage. If <code>[]</code> , <code>slvnvrntest</code> uses the existing coverage settings for model. Default: <code>[]</code>
fastRestart	If <code>true</code> , Simulink Coverage uses fast restart mode for model simulation. Default: <code>true</code>
useParallel	If <code>true</code> , Simulink Coverage simulates test cases with parallel computing. This option requires a Parallel Computing Toolbox™ license. Default: <code>false</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
tout_slvnvrntest	Simulation time
xout_slvnvrntest	State data
yout_slvnvrntest	Output signal data
logsout_slvnvrntest	Signal logging data for: <ul style="list-style-type: none"> • Signals connected to outputs • 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.

Note `cvdata` references a file containing the coverage results. The coverage data from the referenced file is automatically loaded into memory when `cvdata` is used by a coverage function. This file gets stored in the `sldv_covoutput` folder inside the current directory.

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 = slvnvruntestopts;
runOpts.coverageEnabled = true;
open_system('sldemo_mdref_counter');
[ outData ] = slvnvruntest('sldemo_mdref_counter',...
    loggedData, runOpts);

% Examine the output data from the first test case using the Simulation Data Inspector:
Simulink.sdi.createRun('Test Case 1 Output', 'namevalue',...
    {'output'}, {outData(1).find('logout_slvnvruntest')});
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.

Tips

- For `useParallel`, the following points must be considered when simulating test cases using parallel computing:
 - Starting a parallel pool can take time, which impacts the overall analysis time. To reduce the analysis time:
 - Make sure that the parallel pool is already running before you run a test generation analysis. By default, the parallel pool shuts down after being idle for a specified number of minutes. To change the setting, see “Specify Your Parallel Preferences” (Parallel Computing Toolbox).
 - Load Simulink on all the parallel pool workers.
 - The simulation occurs sequentially when:
 - The cluster is not `local`. Configure parallel preferences to use the `local` cluster only. See “Specify Your Parallel Preferences” (Parallel Computing Toolbox).
 - The model is in `dirty` state prior to launching the SLDV analysis.
 - The model has `ToFile` blocks.
 - The model in Software-in-the-loop (SIL) simulation mode.
 - The model is an internal harness.

See Also

`cvsim` | `cvtest` | `sim` | `slvnvruntestopts`

Introduced in R2010b

slvnvruntestopts

Generate simulation or execution options for `slvnvruntest` or `slvnvruncgvtest`

Syntax

```
runOpts = slvnvruntestopts
runOpts = slvnvruntestopts('cgv')
```

Description

`runOpts = slvnvruntestopts` generates a `runOpts` structure for `slvnvruntest`.

`generatrunOpts = slvnvruntestopts('cgv')`es a `runOpts` structure for `slvnvruncgvtest`.

Output Arguments

runOpts — Configuration specification of `slvnvruntest` or `slvnvruncgvtest` structure

`runOpts` can have the following fields. If you do not specify a field, `slvnvruncgvtest` or `slvnvruntest` uses the default value.

Field Name	Description
<code>testIdx</code>	<p>Test case index array to simulate or execute from data file.</p> <p>If <code>testIdx = []</code>, all test cases are simulated or executed.</p> <p>Default: <code>[]</code></p>
<code>signalLoggingSaveFormat</code>	<p>Available only for <code>slvnvruntest</code>.</p> <p>Specifies the format of signal logging data for signals that connect to the output of the model and for intermediate signals that are configured for logging.</p> <p>If you specify <code>Dataset</code>, data is stored in the <code>Simulink.SimulationData.Dataset</code> objects.</p> <p>Default: <code>'Dataset'</code></p>
<code>coverageEnabled</code>	<p>Available only for <code>slvnvruntest</code>.</p> <p>If <code>true</code>, <code>slvnvruntest</code> collects model coverage data during simulation.</p> <p>Default: <code>false</code></p>

Field Name	Description
coverageSetting	<p>Available only for slvnvruntest.</p> <p>cvtest object for collecting model coverage.</p> <p>If coverageSetting is [], slvnvruntest uses the coverage settings for the model specified in the call to slvnvruntest.</p> <p>Default: []</p>
allowCopyModel	<p>Available only for slvnvruncgvtest.</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 true and you have not configured the model to execute test cases with the CGV API, slvnvruncgvtest copies the model, fixes the configuration, and executes the test cases on the copied model.</p> <p>If false, 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, slvnvruncgvtest does not copy the model, even if allowCopyModel is true. An error occurs.</p> <hr/> <p>Default: false</p>
cgvCompType	<p>Available only for slvnvruncgvtest.</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 slvnvruncgvtest.</p> <p>Specifies mode of execution for CGV:</p> <ul style="list-style-type: none"> • 'sim' • 'sil' • 'pil' <p>Default: 'sim'</p>

Field Name	Description
fastRestart	Available only for <code>slvnvruntime</code> . If <code>true</code> , Simulink Coverage uses fast restart mode for model simulation. Default: <code>true</code>
useParallel	Available only for <code>slvnvruntime</code> . If <code>true</code> , Simulink Coverage simulates test cases with parallel computing. This option requires a Parallel Computing Toolbox license. Default: <code>false</code>

Examples

Create runOpts Objects for `slvnvruntime` and `slvnvruncgvttest`

```
% Create runOpts objects for slvnvruntime
runtest_opts = slvnvruntimeopts;

% Create runOpts objects for slvnvruncgvttest
runcgvttest_opts = slvnvruntimeopts('cgv')
```

Alternatives

Create a `runOpts` object at the MATLAB command line.

See Also

`slvnvruncgvttest` | `slvnvruntime`

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 or string 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 quotes. You can specify several name and value pair arguments in any order as `Name1,Value1,...,NameN,ValueN`.

Example:

```
slwebview_cov(gcs, 'SearchScope', 'CurrentAndBelow', 'LookUnderMasks', 'all', 'FollowLinks', 'on')
```

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 or string`

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`slwebview_req`**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 object
<code>total_intervals</code>	Total number of interpolation/extrapolation intervals for object

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

exeCounts

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

Examples

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

```
mdl = 'slvndemo_cv_small_controller';
open_system(mdl)
%Create test spec object
testObj = cvtest(mdl)
%Enable lookup table coverage
testObj.settings.tableExec = 1;
%Simulate the model
data = cvsim(testObj)
blk_handle = get_param([mdl, '/Gain/Gain Table'], 'Handle');
%Retrieve l/u table coverage
cov = tableinfo(data, blk_handle)
%Percent MCDC 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 **Model Settings** on the **Modeling** tab.
- 3 On the **Coverage** pane of the Configuration Parameters dialog box, select **Enable coverage analysis**.
- 4 Under **Coverage metrics**, select **Lookup Table**.
- 5 Click **OK** to close the Configuration Parameters dialog box and save your changes.
- 6 Simulate the model by clicking the **Run** button and review the results.

See Also

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

Topics

“Lookup Table Coverage”

Introduced in R2006b

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';
```

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 or strings

Comma-separated source file names with each name specified as a character vector or string.

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 or strings

Comma-separated mex argument sets, with each set specified as a cell array.

If you invoke `mex` multiple times, you can invoke `slcovmex` once and pass the arguments for each `mex` invocation as a cell array of character vectors.

For example, if you use the following sequence of `mex` commands:

```
mex -c file1.c
mex -c file2.c
mex file1.o file2.o -output sfcnOutput
```

You can replace the sequence with one `slcovmex` invocation:

```
slcovmex({'-c','file1.c'},{'-c','file2.c'},{'file1.o','file2.o',
'-output','sfcnOutput'})
```

Example: {'-c','file1.c'},{'-c','file2.c'},{'file1.o','file2.o','-output','sfcnOutput'}

-sldv — Option to enable support for Simulink Design Verifier

character vector or string

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 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 or string

File name, specified as a character vector or string.

Example: 'myFile.c'

-ifcn — Function ignored for coverage

character vector or string

Function name, specified as a character vector or string.

Example: 'myFunc'

-idir — Folder ignored for coverage

character vector or string

Folder name, specified as a character vector or string.

All files in the folder are ignored for coverage.

Example: 'C:\Libraries\'

See Also

Topics

“Create a Basic C MEX S-Function”

“Templates for C S-Functions”

“Coverage for Custom C/C++ Code in Simulink Models”

“View Coverage Results for Custom C/C++ Code in S-Function Blocks”

Introduced in R2015a

cvdata Properties

Store Simulink Coverage data for use in other coverage functions

Description

cvdata objects store model coverage data. A cvdata object is generated automatically when you simulate a model that has coverage enabled. The coverage data can be accessed by other coverage functions. The cvdata object becomes invalid if its parent model is closed or modified.

Properties

Properties

dbVersion — Coverage data origin release

character array

This property is read-only.

Coverage data origin release, returned as a character array.

Data Types: char

id — Internal coverage data ID

scalar

This property is read-only.

Internal coverage data ID, returned as a scalar.

Data Types: double

type — Internal coverage data type

TEST_DATA | DERIVED_DATA

This property is read-only.

Internal coverage type, returned as either TEST_DATA for a single coverage simulation, or DERIVED_DATA for aggregated or cumulative coverage data.

Data Types: char

test — Test data

cvtest object

This property is read-only.

Test data, returned as a cvtest object. This property describes the coverage configuration.

Data Types: cvtest

rootID — Internal root ID

scalar

This property is read-only.

Internal root ID, returned as a scalar.

Data Types: `double`

checksum — Coverage data checksum

`struct`

This property is read-only.

Coverage data checksum, returned as a struct. The checksum is based on the structure of the model being analyzed. It can be used to determine if two `cvdata` objects would be compatible for data aggregation.

Data Types: `struct`

modelinfo — Model information

`struct`

This property is read-only.

Model information, returned as a struct. This property contains metadata about the model analyzed for coverage.

`cvdata.modelinfo` has the following fields:

Field	Description	Values
<code>modelVersion</code>	Version of the model analyzed for coverage.	character array containing version number
<code>creator</code>	Original creator of the model.	System name or organization name
<code>lastModifiedDate</code>	Date and time the model was last modified.	character array containing date and time
<code>defaultParameterBehavior</code>	Indicates the default parameter behavior setting.	'Tunable' 'Inlined'
<code>blockReductionStatus</code>	Indicates whether Block Reduction is enabled. See "Block Reduction" for more information.	'off' 'on'
<code>conditionallyExecuteInputs</code>	Conditional input execution switch. A value of 1 is 'on', and a value of 0 is 'off'.	1 0

Field	Description	Values
mdcdMode	Definition used for modified condition decision coverage (MCDC) analysis. A value of 1 indicates the model used the masking definition of MCDC and a value of 0 indicates the model used the unique-cause definition of MCDC. For more information, see “Modified Condition and Decision Coverage (MCDC) Definitions in Simulink Coverage”.	1 0
analyzedModel	Name of the analyzed model or model object. If analysis is scoped to a subsystem, Stateflow Chart, or other model object, this is the path to that model object.	character array
reducedBlocks	List of blocks reduced by the block reduction parameter, if it is enabled and any blocks are reduced.	character array
ownerModel	Model that is or contains the component under test. If you have a block diagram harness, this is the model that the harness tests. If you have a subsystem harness, this is the model that contains that subsystem.	character array
ownerBlock	If the model includes a subsystem harness, this is the subsystem that the harness is testing.	character array
harnessModel	Harness model name. If you have data aggregated from multiple test runs, where each run used a different harness with the same ownerModel, this field shows Not Unique.	character array
logicBlkShortcircuit	Indicates whether the short-circuiting option is enabled.	0 1

Data Types: struct

startTime — System time at simulation start
character array

System time at simulation start, returned as a character array.

Data Types: char

stopTime — System time at simulation stop

scalar

System time at simulation stop, returned as a character array.

Data Types: char

intervalStartTime — Coverage interval start time

scalar

Coverage interval start time, returned as a scalar. This value comes from the CovStartTime parameter. For more information, see “Coverage interval start time” on page 2-15.

Data Types: double

intervalStopTime — Coverage interval stop time

scalar

Coverage interval stop time, returned as a scalar. This value comes from the CovStopTime parameter. For more information, see “Coverage interval stop time” on page 2-15.

Data Types: double

metrics — Coverage metric data

struct

Coverage metric data, returned as a struct.

This parameter is for internal use only. Access the coverage data for specific coverage metrics by using one of the Simulink Coverage information functions. See “Retrieve Coverage Details from Results” for more information. You can also access the coverage data by using cvhtml.

Data Types: struct

filter — Coverage filter file name

character array | cell array

Coverage filter file name, returned as a character array or a cell array of character arrays. This property contains the coverage filter file name. If there is no coverage filter, this field is empty. You can apply a coverage filter after simulation by assigning the name of a valid filter file to this property.

Data Types: char | cell

simMode — Simulation mode

character array

Simulation mode, returned as a character array. For more information, see “Simulation mode”.

Data Types: char

See Also

cv.cvdatabgroup | cvhtml | cvsims

Topics

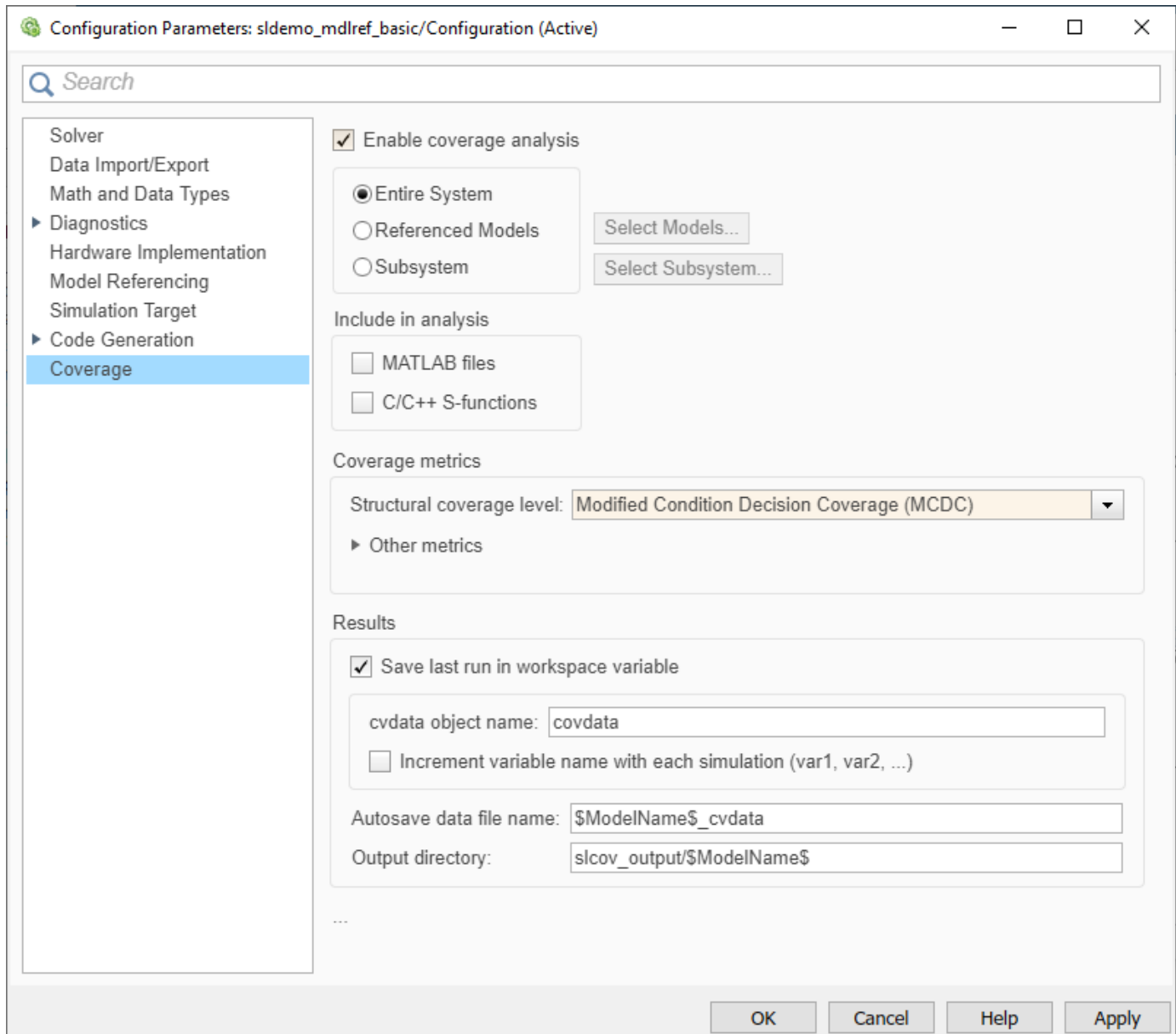
“Collect Coverage Data”

“Evaluate Coverage Results”

Introduced before R2006a

Simulink Coverage Settings

Coverage Settings



In this section...

- “Coverage Pane Overview” on page 2-3
- “Enable coverage analysis” on page 2-4
- “Scope of coverage analysis” on page 2-4
- “Select Models” on page 2-4
- “Select Subsystem” on page 2-5
- “Record coverage for MATLAB files” on page 2-6

In this section...

"Record coverage for C/C++ S-functions" on page 2-7
 "Structural coverage level" on page 2-7
 "Lookup table" on page 2-8
 "Signal range" on page 2-8
 "Signal size" on page 2-9
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 "Relational boundary coverage relative tolerance" on page 2-11
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 "Cumulative coverage variable name" on page 2-25

Coverage Pane Overview

Specify the Simulink Coverage analysis options.

Enable coverage analysis

Enable coverage analysis. See “Specify Coverage Options”.

Settings

On

Coverage data is collected during simulation.

Off (default)

Coverage data is not collected during simulation.

Command-Line Information

Parameter: CovEnable

Type: Character vector or string

Value: 'on' | 'off'

Default: 'off'

Scope of coverage analysis

Specify whether the analysis must collect coverage data for the entire system, or a specific referenced model or subsystem.

Settings

Entire System (default)

Coverage data is collected for the top-level model, as well as all supported subsystems and model references.

Referenced Models

Coverage data is collected for one or more referenced models. To specify the referenced models, use the parameter “Select Models” on page 2-4. You can also specify the top-level model itself.

Subsystem

Coverage data is collected for a specific subsystem. To specify a subsystem, use the parameter “Select Subsystem” on page 2-5.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovScope

Type: Character vector or string

Value: 'EntireSystem' | 'ReferencedModels' | 'Subsystem'

Default: 'EntireSystem'

Select Models

Specify the referenced models for which you want coverage.

Settings

In the **Select Models for Coverage Analysis** dialog box, select the referenced models for which you want coverage. You can also select the top-level model. The icon next to the model name indicates the simulation mode: Normal, SIL, or PIL.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- Specify referenced models for “Scope of coverage analysis” on page 2-4.

Command-Line Information

Note Unlike in the user interface, on the command line, you *exclude* models from coverage instead of including them.

Parameter: CovModelRefExcluded

Type: Character vector or string

Value: Comma-separated list of model names, for instance, 'mRefA, mRefB, mRefC'. If the same model is referenced in two simulation modes, you can distinguish between them using :, for instance, 'mRefA:normal, mRefA:sil'.

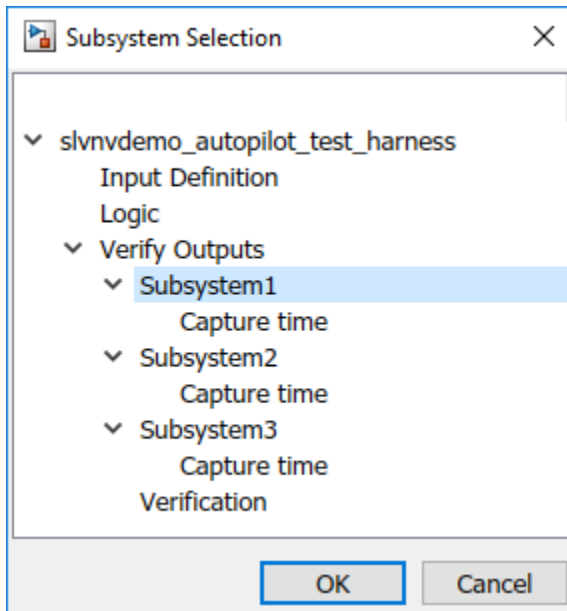
Default: ''

Select Subsystem

Specify the path to the subsystem for which Simulink Coverage collects coverage data. Specify the path relative to the top model.

Settings

Select the subsystem for which you want coverage.



Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Scope of coverage analysis” on page 2-4

Command-Line Information

Parameter: CovPath

Type: Character vector or string

Value: Path to subsystem relative to (and excluding) the top-level Simulink system, for instance, 'Subsys1/subsys2'

Default: '/'. Coverage data is reported for the entire system.

Record coverage for MATLAB files

Enable coverage for MATLAB functions in external MATLAB files. The functions can be invoked from MATLAB Function blocks or Stateflow charts in your model. See “Model Coverage for MATLAB Functions”.

Settings

On (default)

Coverage data is collected for MATLAB functions in external MATLAB files. The functions can be called from MATLAB Function blocks or Stateflow charts in the model.

Off

Coverage data is not collected for external MATLAB files.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information**Parameter:** CovExternalEMLEnable**Type:** Character vector or string**Value:** 'on'|'off'**Default:** 'on'**Record coverage for C/C++ S-functions**

Enable coverage for C/C++ code in S-Function blocks in your model. See also “Coverage for Custom C/C++ Code in Simulink Models”.

Settings
 On (default)

Coverage data is collected for C/C++ code in S-Function blocks in the model.

 Off

Coverage data is not collected for C/C++ code used in the model.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Record coverage for this model” on page 2-19 or “Record coverage for referenced models” on page 2-20 (enter on)

Command-Line Information**Parameter:** CovSFcnEnable**Type:** Character vector or string**Value:** 'on'|'off'**Default:** 'on'**Structural coverage level**

Select the type of coverage data collected. See also “Types of Model Coverage”.

Settings

Decision (default)

The analysis computes decision coverage during simulation

Decision coverage analysis checks blocks that perform an action based on whether an operation evaluates to true or false. For instance, the Abs block first evaluates if the input is less than zero and acts accordingly. For each operation that can evaluate to true or false, the analysis reports what fraction of the outcomes was true during simulation and what fraction was false.

See “Decision Coverage (DC)”.

Condition/Decision

The analysis computes condition and decision coverage during simulation.

Condition coverage analysis checks blocks that output a logical combination of their inputs (such as Logical Operator blocks). For each block, the analysis records what fraction of the inputs was true during simulation and what fraction was false.

See “Condition Coverage (CC)”.

Modified Condition/Decision Coverage (MCDC)

The analysis computes Modified Condition/Decision Coverage (MCDC) during simulation.

See “Modified Condition/Decision Coverage (MCDC)”.

Block Execution

The analysis checks if each block executes at least once during simulation.

See “Execution Coverage (EC)”.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovMetricStructuralLevel

Type: Character vector or string

Value: 'BlockExecution' | 'ConditionDecision' | 'Decision' | 'MCDC'

Default: 'Decision'

Lookup table

Enable lookup table coverage. See “Types of Model Coverage”.

Settings

On

Blocks with lookup tables are checked for coverage. A test case achieves full coverage of a lookup table if it executes each interval of the table at least once.

Off (default)

Lookup table coverage is not recorded.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovMetricLookupTable

Type: Character vector or string

Value: 'on' | 'off'

Default: 'off'

Signal range

Enable signal range coverage. See “Types of Model Coverage”.

Settings

On

Maximum and minimum signal values are recorded for each block that has an output signal.

Off (default)

Signal range information is not recorded.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovMetricSignalRange

Type: Character vector or string

Value: 'on'|'off'

Default: 'off'

Signal size

Enable signal size coverage. See “Types of Model Coverage”.

Settings

On

Maximum, minimum and allocated signal size are recorded for each block that has a variable-size output signal. See “Variable-Size Signal Basics”.

Off (default)

Signal size information is not recorded.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovMetricSignalSize

Type: Character vector or string

Value: 'on'|'off'

Default: 'off'

Objectives and constraints

Enable coverage of objectives and constraints specified in Simulink Design Verifier blocks. See “Types of Model Coverage”.

Settings

On

Through Simulink Design Verifier blocks, you can specify objectives and constraints in your model. To check if these objectives are satisfied, you first generate test cases using these blocks.

You can execute these test cases on the original model and record whether the specified objective was satisfied at least once. To record this coverage, enable this parameter.

For an example, see “Simulink Design Verifier Coverage”.

Off (default)

Coverage information is not recorded for Simulink Design Verifier blocks.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovMetricObjectiveConstraint

Type: Character vector or string

Value: 'on'|'off'

Default: 'off'

Saturation on integer overflow

Enable saturation on integer overflow coverage. See “Types of Model Coverage”.

Settings

On

For certain blocks, such as the Abs block, you can specify that they must saturate on integer overflow. If you enable this parameter, the number of times these blocks saturate during simulation is recorded.

Off (default)

Saturation on integer overflow information is not recorded.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovMetricSaturateOnIntegerOverflow

Type: Character vector or string

Value: 'on'|'off'

Default: 'off'

Relational boundary

Enable relational boundary coverage. See “Types of Model Coverage”.

Settings

On

Certain blocks such as the Relational Operator or If block use a relational operation. If you enable this parameter, the coverage analysis checks if these operations are executed with equal (integer) or almost equal (floating-point) values.

Off (default)

Relational boundary coverage information is not recorded.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovMetricRelationalBoundary

Type: Character vector or string

Value: 'on'|'off'

Default: 'off'

Relational boundary coverage absolute tolerance

Specify the value of absolute tolerance for relational boundary coverage. See “Relational Boundary Coverage”.

Settings

Enter a floating-point value. See “Floating-Point Numbers”.

Relational boundary coverage checks blocks with relational operations (such as the Relational Operator block). The analysis checks if the operations are executed with floating-point operands that differ by at most this value.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Relational boundary” on page 2-10

Command-Line Information

Parameter: CovBoundaryAbsTol

Type: Floating-point number

Value: Absolute tolerance value such as 1e-06

Default: 1e-05

Relational boundary coverage relative tolerance

Specify the value of relative tolerance for relational boundary coverage. See “Relational Boundary Coverage”.

Settings

Enter a number less than 1.

Relational boundary coverage checks blocks with relational operations (such as the Relational Operator block). The analysis checks if the operations are executed with floating-point operands that differ by at most this fraction of the operands.

For instance, if you enter 0.01, the analysis checks if an operation $lhs \leq rhs$ in your model is executed with operands that differ by at most:

$$0.01 * \max(|lhs|, |rhs|)$$

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Relational boundary” on page 2-10

Command-Line Information

Parameter: CovBoundaryRelTol

Type: Floating-point number

Value: Relative tolerance value such as 0.001

Default: 0.01

Save last run in workspace variable

Save the coverage data from simulation in a MATLAB variable.

You can retrieve coverage information from this variable later. For instance, to retrieve decision coverage information, use the `decisioninfo` function. For the full list of functions, see “Automate Coverage Workflows”.

Settings

On

Coverage data is stored in a `cvdata` object in the MATLAB workspace. Specify the object name using the parameter “Last coverage run variable name” on page 2-12. Choose to create a new object for each simulation using the parameter “Increment variable name with each simulation” on page 2-13.

Off (default)

Coverage data is not stored in a MATLAB variable.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovSaveSingleToWorkspaceVar

Type: Character vector or string

Value: 'on' | 'off'

Default: 'off'

Last coverage run variable name

Specify a name for the `cvdata` object that contains coverage results from the last simulation.

Settings

Enter a name, for instance, `coverageData`.

If you want a new variable to store coverage results for each simulation, use the parameter “Increment variable name with each simulation” on page 2-13. The new variable name is created by appending a counter value to the original name, for instance, `coverageData1`, `coverageData2`, and so on.

The default variable name is `covdata`.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Save last run in workspace variable” on page 2-12

Command-Line Information

Parameter: `CovSaveName`

Type: Character vector or string

Value: Name to be given to `cvdata` object

Default: `'covdata'`

Increment variable name with each simulation

Create a new variable to store coverage results for each new simulation.

Settings

On

A new `cvdata` object stores coverage results for each simulation.

The new variable name is created by appending a counter value to the original variable name from the first simulation. Specify the original variable name using the parameter “Last coverage run variable name” on page 2-12.

Off (default)

Each new simulation overwrites the coverage results from the previous simulation. A single `cvdata` object stores the coverage results from the most recent simulation.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Save last run in workspace variable” on page 2-12

Command-Line Information

Parameter: `CovNameIncrementing`

Type: Character vector or string

Value: `'on'|'off'`

Default: `'off'`

Autosave data file name

Specify name of .cvt file to which coverage data is automatically saved.

Settings

Enter file name. The default name is `$modelName$.cvtdata`, where `$modelName$` is the model name.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Save output data” on page 2-23

Command-Line Information

Parameter: CovDataFileName

Type: Character vector or string

Value: Name to be given to .cvt file

Default: '`$modelName$.cvtdata`'

Output directory

Specify a folder in which coverage output files are saved.

Settings

Enter path to folder. You can enter the absolute path or path relative to the current working folder.

By default, the files are saved in a subfolder `slcov_output/$modelName$` relative to the current working folder. Here `$modelName$` is the model name.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovOutputDir

Type: Character vector or string

Value: Path to folder

Default: '`slcov_output/$modelName$`'

Restrict coverage recording interval

Record coverage only for a specified time interval.

For instance, 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.

Settings

On

Coverage is recorded only for the time interval that you specify. To specify a time interval, use these parameters:

- “Coverage interval start time” on page 2-15
- “Coverage interval stop time” on page 2-15

Off (default)

Coverage is recorded for the entire duration of simulation.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovUseTimeInterval

Type: Character vector or string

Value: 'on'|'off'

Default: 'off'

Coverage interval start time

Specify when coverage data collection must begin.

Settings

Enter a time value (in seconds).

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Restrict coverage recording interval” on page 2-14

Command-Line Information

Parameter: CovStartTime

Type: Floating-point number

Value: Time in seconds, for instance, 2

Default: 0

Coverage interval stop time

Specify when coverage data collection must end.

Settings

Enter a time value (in seconds).

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Restrict coverage recording interval” on page 2-14

Command-Line Information

Parameter: CovStopTime

Type: Floating-point number

Value: Time in seconds, for instance, 4

Default: 0

Force block reduction off

Report coverage for every block in the model that is supported for coverage.

Settings

On (default)

Coverage is recorded for every supported block in the model. The value of the configuration parameter **Block reduction** is ignored. See “Block reduction”.

Off

Coverage is not recorded for blocks that are effectively removed from the model because of block reduction. For instance, coverage is not recorded for a block that is reduced by dead code elimination.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovForceBlockReductionOff

Type: Character vector or string

Value: 'on' || 'off'

Default: 'on'

Treat Simulink logic blocks as short-circuited

Specify that coverage must take into account the order of operands in blocks that perform a logical operation, for instance, Logical operator blocks.

For instance, if the order of the two inputs to a Logical AND block is taken into account, the second input is redundant when the first input is false. Therefore, for cases where the first input is false, the paths that lead to the second input are not considered for coverage.

Settings

On

Coverage analysis does not consider the input to a logical operation that is rendered redundant by another input.

Off (default)

Coverage analysis considers all inputs to a logical operation.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovLogicBlockShortCircuit

Type: Character vector or string

Value: 'on' || 'off'

Default: 'off'

MCDC mode

Specify the definition of Modified Condition/Decision Coverage (MCDC) to use during coverage analysis. See “Modified Condition and Decision Coverage (MCDC) Definitions in Simulink Coverage”.

Settings

Masking

Use masking MCDC analysis. To establish the independence of inputs, masking MCDC analysis does not require that all other inputs be strictly held constant while one input is varied.

Therefore, masking MCDC analysis allows you to satisfy greater number of objectives in a given simulation.

Unique-Cause

Use unique-cause MCDC analysis.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- Specify Modified Condition/Decision Coverage (MCDC) for “Structural coverage level” on page 2-7.

Command-Line Information

Parameter: CovMcdcMode

Type: Character vector or string

Value: 'Masking' || 'UniqueCause'

Default: 'Masking'

Warn when unsupported blocks exist in model

Warn when unsupported blocks exist in model.

Settings

On (default)

Provide a warning when blocks in the model are not supported for coverage analysis.

Off

Do not provide a warning for unsupported blocks.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovUnsupportedBlockWarning

Type: Character vector or string

Value: 'on'|'off'

Default: 'on'

Coverage filter filename

Specify a filter file to exclude certain model objects from coverage analysis during simulation.

You can use a command-line API to create filtering rules for blocks. Selection criteria for filtering includes filtering by individual block ID, filtering for all blocks of the same type, filtering certain decisions, conditions, and outcomes of a block, and more. You can also filter S-Function C++ code by code coverage outcome.

For an example of filtering, see:

- User interface: “Create, Edit, and View Coverage Filter Rules”.
- Command line: R2017b release notes for Simulink Coverage.

Settings

Enter full path to .cvf file with filter rules.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovFilter

Type: Character vector or string

Value: Full path to .cvf file

Default:

Coverage metric settings

Specify the type of coverage metric to be recorded. See also “Types of Model Coverage”.

Settings

Enter a sequence of letters that describe the coverage metric types. For instance, the sequence `dc` indicates that the decision and condition coverage must be recorded.

The coverage metric types are:

- `d`: Decision coverage

- c: Condition coverage
- m: MCDC coverage
- t: Lookup table coverage
- r: Signal range coverage
- o: Coverage for Simulink Design Verifier blocks
- b: Relational boundary coverage
- r: Signal range coverage

Additionally, you can use these letters. The letters correspond to other parameters.

- s: “Treat Simulink logic blocks as short-circuited” on page 2-16
- w: “Warn when unsupported blocks exist in model” on page 2-17
- e: Disables display coverage results using model coloring

Note `CovHighlightResults` has been removed. Include `e` in `CovMetricSettings` to avoid a warning message.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- One of these: “Record coverage for this model” on page 2-19, “Record coverage for referenced models” on page 2-20 (enter on) or “Record coverage for MATLAB files” on page 2-6

Command-Line Information

Parameter: `CovMetricSettings`

Value: Character vector or string where each character signifies a coverage metric. For instance, 'dc' specifies decision and condition coverage.

Default: 'dwe'

Record coverage for this model

Record model coverage data during simulation.

Note This parameter represents a deprecated workflow. Instead use these parameters:

- To enable coverage, use “Enable coverage analysis” on page 2-4.
 - To perform coverage analysis for the entire model, use “Scope of coverage analysis” on page 2-4.
-

Settings

On (default)

Simulink collects model coverage data during simulation.

Off

Model coverage data is not collected or reported.

Command-Line Information

Parameter: RecordCoverage

Type: Character vector or string

Value: 'on'|'off'

Default: 'on'

Record coverage for referenced models

Record coverage data for referenced models during simulation.

Note This parameter represents a deprecated workflow. Instead use these parameters:

- To enable coverage, use “Enable coverage analysis” on page 2-4.
 - To perform coverage analysis for referenced models, use “Scope of coverage analysis” on page 2-4.
 - To specify the referenced models, use “Select Models” on page 2-4.
-

Settings

Enter one of these:

- **on:** Coverage data is collected for all referenced models.
- **off:** Coverage data is not collected for referenced models.
- **filtered:** Coverage data is collected for all referenced models except those excluded using the parameter “Select Models” on page 2-4.

Command-Line Information

Parameter: CovModelRefEnable

Type: Character vector or string

Value: 'on'|'off'|'filtered'

Default: 'off'

Include top model

Record coverage for the top-level model in addition to referenced models.

Note This parameter represents a deprecated workflow. Instead use these parameters:

- To enable coverage, use “Enable coverage analysis” on page 2-4.
 - To perform coverage analysis for referenced models, use “Scope of coverage analysis” on page 2-4.
 - To include or exclude the top-level model, use “Select Models” on page 2-4.
-

Settings On (default)

Coverage data is collected for the top-level model.

 Off

Coverage data is not collected for the top-level model.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- Specify referenced model for “Scope of coverage analysis” on page 2-4.

Command-Line Information**Parameter:** CovIncludeTopModel**Type:** Character vector or string**Value:** 'on' | 'off'**Default:** 'on'**Coverage report options**





Specify the formatting of certain aspects of the coverage report (HTML).

Note For an easier way to specify report formatting, see Report from Results Explorer.

Settings

Enter a space-separated list of flags. The available flags are:

- '-sRT=0' — Do not show report
- '-sVT=1' — Open a web view of the report in a browser. See also “Export Model Coverage Web View”.
- '-aTS=1' — Show each test in the model summary.
- '-bRG=1' — Show bar graphs in the model summary.

Summary					
Model Hierarchy/Complexity	Test 1	Decision	Condition	MCDC	Execution
1. slvnydemo_counter	3	25% 	50% 	0% 	86% 

- '-bTC=1' — Use two color bar graphs (red, blue).
- '-hTR=1' — Display hit/count ratio in the model summary.

Summary

Model Hierarchy/Complexity	Test 1	Decision	Condition	MCDC	Execution
1. slvndemo_counter	3	25% (1/4)	50% (4/8)	0% (0/2)	86% (6/7)

- ' -nFC=0 ' — Do not report fully covered model objects
- ' -scm=1 ' — Include cyclomatic complexity numbers in summary. See also “Cyclomatic Complexity”.
- ' -bcm=1 ' — Include cyclomatic complexity numbers in block details.
- ' -xEv=0 ' — Filter Stateflow events from report.
- ' -agT=1 ' — Show aggregated tests information in coverage report.
- ' -req=1 ' — Include linked requirements in aggregated coverage report.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4

Command-Line Information

Parameter: CovHTMLOptions

Type: Character vector or string

Value:

Default:

Additional data to include in coverage report

Include additional model coverage data from cvdata objects in the model coverage report.

Settings

Enter the name of a cvdata object associated with a simulation.

You get a cvdata object when you record coverage and save coverage data in a workspace variable. See:

- “Last coverage run variable name” on page 2-12
- “Cumulative coverage variable name” on page 2-25

You also get a cvdata object if you run simulation using the cvsim function. See cvsim.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4

Command-Line Information**Parameter:** CovCompData**Type:** Character vector or string**Value:** Name of cvdata object.**Default:** No default**Update coverage results on pause**

Update coverage report when you pause during simulation. The report is updated with coverage results up to the current pause or stop time.

Settings On (default)

Coverage report is updated when you pause simulation.

 Off

Coverage report is not updated when you pause simulation.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information**Parameter:** CovReportOnPause**Type:** Character vector or string**Value:** 'on'|'off'**Default:** 'on'**Save output data**

Save coverage data results to a file.

Settings On (default)

Coverage data results are saved to a file. Specify the file name using the parameter “Autosave data file name” on page 2-14.

 Off

Coverage data results are not saved to a file.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information**Parameter:** CovSaveOutputData**Type:** Character vector or string**Value:** 'on'|'off'**Default:** 'on'

Enable cumulative data collection

Collect model coverage results from successive simulations. See also “Cumulative Coverage Data”.

Note For an easier way to accumulate coverage data from multiple simulations, see “Accumulating Coverage Data from the Results Explorer”.

Settings

On (default)

Model coverage data from successive simulations are collected together.

To show the cumulative data in one report, use the parameter “Include cumulative data in coverage report” on page 2-24. To save the data in one workspace variable, use the parameters “Save cumulative coverage results in workspace variable” on page 2-25 and “Cumulative coverage variable name” on page 2-25.

Off

Model coverage data is retained for the most recent simulation only.

Dependency

To enable this parameter, select “Enable coverage analysis” on page 2-4.

Command-Line Information

Parameter: CovEnableCumulative

Type: Character vector or string

Value: 'on'|'off'

Default: 'on'

Include cumulative data in coverage report

Show model coverage results from successive simulations in a single HTML report.

Note For an easier way to accumulate coverage data from multiple simulations, see “Accumulating Coverage Data from the Results Explorer”.

Settings

On

The HTML report shows model coverage data from successive simulations.

Off (default)

The HTML report shows model coverage data from the most recent simulation.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Enable cumulative data collection” on page 2-24

Command-Line Information

Parameter: CovCumulativeReport

Type: Character vector or string

Value: 'on' || 'off'

Default: 'off'

Save cumulative coverage results in workspace variable

Save model coverage data from successive simulations in a single `cvdata` object in the MATLAB workspace.

You can retrieve coverage information from this variable later. For instance, to retrieve decision coverage information, use the `decisioninfo` function. For the full list of functions, see “Automate Coverage Workflows”.

Note For an easier way to accumulate coverage data from multiple simulations, see “Accumulating Coverage Data from the Results Explorer”.

Settings

On

A single `cvdata` object stores model coverage data from successive simulations. See “Cumulative Coverage Data”.

Specify the variable name using the parameter “Cumulative coverage variable name” on page 2-25.

Off (default)

The `cvdata` object stores model coverage data from the most recent simulation.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Enable cumulative data collection” on page 2-24

Command-Line Information

Parameter: CovSaveCumulativeToWorkspaceVar

Type: Character vector or string

Value: 'on' || 'off'

Default: 'off'

Cumulative coverage variable name

Specify the name of the `cvdata` object that saves coverage data from successive simulations.

Note For an easier way to accumulate coverage data from multiple simulations, see “Accumulating Coverage Data from the Results Explorer”.

Settings

Enter variable name, for instance, `cumulativeCoverageData`.

Dependency

To enable this parameter, select:

- “Enable coverage analysis” on page 2-4
- “Save cumulative coverage results in workspace variable” on page 2-25
- “Enable cumulative data collection” on page 2-24

Command-Line Information

Parameter: `CovCumulativeVarName`

Type: Character vector or string

Value: Name to be given to `cvdata` object

Default: `'covCumulativeData'`

Classes

slcoverage.BlockSelector class

Package: slcoverage

Select blocks for coverage filter

Description

Specify block selection criteria for a filter rule.

Construction

`sel = slcoverage.BlockSelector(type,element)` specifies the type of model elements to create the filter rule for and returns an `slcoverage.BlockSelector` object.

Input Arguments

type — Block selector type

`slcoverage.BlockSelectorType` value

Type of model element to select, specified as one of these values:

- `slcoverage.BlockSelectorType.BlockInstance` — An instance of a block.
- `slcoverage.BlockSelectorType.BlockType` — All blocks of the specified block type.
- `slcoverage.BlockSelectorType.Chart` — A Stateflow chart.
- `slcoverage.BlockSelectorType.MaskType` — Blocks that use the specified mask type.
- `slcoverage.BlockSelectorType.State` — A Stateflow state.
- `slcoverage.BlockSelectorType.StateAllContent` — Stateflow state and its contents.
- `slcoverage.BlockSelectorType.StateflowFunction` — A Stateflow function.
- `slcoverage.BlockSelectorType.Subsystem` — A subsystem block.
- `slcoverage.BlockSelectorType.SubsystemAllContent` — A subsystem and its contents.
- `slcoverage.BlockSelectorType.TemporalEvent` — A Stateflow temporal event.
- `slcoverage.BlockSelectorType.Transition` — A Stateflow transition.

Example: `slcoverage.BlockSelectorType.Transition`

element — Model element to select

property name | handle | Simulink ID

Model element to select, specified as a property name of the element, its handle, or its Simulink identifier. Use a handle or ID for selector types that select an instance. Use a property name, such as the value of a block's 'BlockType' property, to select multiple model elements.

Example: `'sldemo_lct_bus:18'`, `'RelationalOperator'`

Outputs

sel — Selector object

slcoverage.BlockSelector object | array of slcoverage.BlockSelector objects

Selector object, returned as an slcoverage.BlockSelector object or array of slcoverage.BlockSelector objects.

Properties

ConstructorCode — Code used to create this selector object

character vector

This property is read-only.

Code used to create this selector object, returned as a character vector.

Description — Description of the selector

character vector

This property is read-only.

Description of the selector, returned as a character vector. Simulink Coverage creates the description based on the selector.

Id — Element identifier

Simulink ID (default) | property | handle

This property is read-only.

Identifier of the model element, returned as character vector of the Simulink ID, model element property, or handle. This property is empty for the slcoverage.CodeSelector class.

Type — Block selector type

slcoverage.BlockSelectorType value

This property is read-only.

Selector type, returned as one of these slcoverage.BlockSelectorType values:

- BlockInstance
- BlockType
- Chart
- MaskType
- State
- StateAllContent
- StateflowFunction
- Subsystem
- SubsystemAllContent
- TemporalEvent

- Transition

Methods

`allSelectors` Selectors for model or code element

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects.

Examples

Add Block Selector Rules to a Filter

Select multiple blocks to add a rule for and an instance of a block to add a rule for. The resulting filter has two rules. You can simulate your model for code coverage using the filter to see the effect.

Open the model. Specify coverage settings and turn on coverage recording.

```
modelName = 'sldemo_lct_bus';
open_system(modelName);
set_param(modelName, 'CovMetricSettings', 'dcme', 'RecordCoverage', 'on');
```

Select blocks that have the same block type as the upper GE input block to add a filter rule for.

```
type = get_param('sldemo_lct_bus/slCounter/upper GE input', 'BlockType');
bl = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockType, type);
```

Create a filter object, create a rule based on the selector, and add the rule to the filter.

```
filt = slcoverage.Filter;
rule = slcoverage.FilterRule(bl, 'Tested elsewhere', slcoverage.FilterMode.Exclude);
filt.addRule(rule);
```

Select a block instance and add a rule for the block instance to the filter. This rule uses the default filter mode of Justify.

```
id = Simulink.ID.getSID('sldemo_lct_bus/slCounter/And');
bl = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockInstance, id);
rule = slcoverage.FilterRule(bl, 'Edge case');
filt.addRule(rule);
```

Save the filter as `blfilter`. Simulate the model for code coverage. Add the filter file as the value to the `filter` property of the resulting `cvdata` object. Then generate the coverage report.

```
filt.save('blfilter');
csim = cvsim(modelName);
csim.filter = 'blfilter';
cvhtml('cov', csim);
```

Examine the HTML report to see information about the blocks that you added rules for.

See Also

`cv.cvdatabagroup` | `getSimulinkBlockHandle` | `slcoverage.Filter` | `slcoverage.FilterRule` | `slcoverage.MetricSelector` | `slcoverage.SFCnSelector`

Topics

“Top-Level Model Coverage Report”

“Simulink Identifiers”

“Create, Edit, and View Coverage Filter Rules”

Introduced in R2017b

slcoverage.CodeSelector class

Package: slcoverage

Select custom C/C++ code for coverage filter

Description

Specify custom C/C++ code selection criteria for a filter rule.

Construction

`sel = slcoverage.CodeSelector(type, file)` creates the selector based on the C or C++ file.

`sel = slcoverage.CodeSelector(type, file, function)` creates the selector based on the C or C++ function in the file.

`sel = slcoverage.CodeSelector(type, file, function, expression, index)` creates the selector based on the index of the decision or condition expression.

Input Arguments

type — Code selector type

`slcoverage.CodeSelectorType` value

Type of custom C/C++ code to select, as one of these values:

- `slcoverage.CodeSelectorType.File` — Custom C/C++ code file name.
- `slcoverage.CodeSelectorType.Function` — Custom C/C++ code function name.
- `slcoverage.CodeSelectorType.Decision` — A custom C/C++ code decision.
- `slcoverage.CodeSelectorType.Condition` — A custom C/C++ code condition.

Example: `slcoverage.CodeSelectorType.Function`

file — C or C++ file to select

character vector or string

C or C++ file to select, specified as a character vector or string.

Example: `'myfile.c'`

function — C or C++ function to select

character vector or string

C or C++ function to select, specified as a character vector or string.

Example: `'counterbusFcn'`

expression — Decision expression to select

character vector or string

Decision or condition expression to select, specified as a character vector or string.

Example: 'inputGELower'

index — Matrix position of expression to select

integer

Matrix position of expression to select, specified as an integer.

Example: 2

Outputs

sel — Selector object

slcoverage.CodeSelector object | array of slcoverage.CodeSelector objects

Selector object, returned as an slcoverage.CodeSelector object or array of slcoverage.CodeSelector objects.

Properties

ConstructorCode — Code used to create this selector object

character vector

This property is read-only.

Code used to create this selector object, returned as a character vector.

Description — Description of the selector

character vector

This property is read-only.

Description of the selector, returned as a character vector. Simulink Coverage creates the description based on the selector.

Id — Element identifier

Simulink ID (default) | property | handle

This property is read-only.

Identifier of the model element, returned as character vector of the Simulink ID, model element property, or handle. This property is empty for the slcoverage.CodeSelector class.

Type — Code selector type

slcoverage.CodeSelectorType value

This property is read-only.

Selector type, returned as one of these slcoverage.CodeSelectorType values:

- File
- Function
- Decision
- Condition

Methods

allSelectors Selectors for model or code element

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects.

Examples

Add Code Selector Rules to a Filter

Select custom C/C++ code to add a rule for and select a code construct to add a rule for. The resulting filter has one rule. You can simulate your model for coverage by using the filter to see the effect.

Open the model. Specify coverage settings and turn on coverage recording.

```
modelName = 'slexCCallerExample';
open_system(modelName);
set_param(modelName, 'SimAnalyzeCustomCode', 'on', 'CovMetricSettings','dcme',...
'RecordCoverage', 'on');
```

Add a filter rule for the custom C function times2.

```
sel = slcoverage.CodeSelector(slcoverage.CodeSelectorType.Function, 'my_func.c', 'times2');
```

Create a filter object, create a rule based on the selector, and add the rule to the filter.

```
filt = slcoverage.Filter;
rule = slcoverage.FilterRule(sel, 'Tested elsewhere', slcoverage.FilterMode.Exclude);
filt.addRule(rule);
```

Save the filter as codefilter. Simulate the model for code coverage. Add the filter file to the filter property of the resulting cvdata object.

```
filt.save('codefilter');
csim = cvsims(modelName);
csim.get('my_func.c').filter = 'codefilter';
```

Generate a coverage report.

```
cvhtml('cov',csim);
```

Review the report. Click the my_func.c Custom Code File(s) link and find the filter rule that you added under Objects Filtered from Coverage Analysis.

Analysis Information

Objects Filtered from Coverage Analysis

Code	Rationale
Function <code>times2</code> (line 3)	Tested elsewhere

See Also

`cv.cvdatabgroup` | `slcoverage.Filter` | `slcoverage.FilterRule` | `slcoverage.MetricSelector` | `slcoverage.SFcnSelector`

Topics

“Top-Level Model Coverage Report”

“Create, Edit, and View Coverage Filter Rules”

Introduced in R2018b

slcoverage.Filter class

Package: slcoverage

Coverage filter set

Description

Create a coverage filter object to add filter rules to.

Construction

`filt = slcoverage.Filter()` creates an `slcoverage.Filter` object.

`filt = slcoverage.Filter(filterFile)` adds the filter rules in `filterFile` to the filter.

Input Arguments

filterFile — Filter file

path name

Filter file (.cvf file), specified as a character vector of the path name to the file. You do not need to include the extension.

Example: 'myfilt', 'filters/myfilt'

Methods

<code>addRule</code>	Add coverage filtering rule to filter
<code>removeRule</code>	Remove rule from filter rule set
<code>rules</code>	Rules for filter

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects.

Examples

Create and Use a Filter Object

Create a filter object and add a rule to it. In this example, you add a rule to exclude some blocks from coverage testing.

Open the model. Specify coverage settings and turn on coverage recording.

```
modelName = 'sldemo_lct_bus';  
open_system(modelName);  
set_param(modelName, 'CovMetricSettings', 'dcme', 'RecordCoverage', 'on');
```


Select blocks with block type 'RelationalOperator' to add a filter rule for.

```
bl = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockType, 'RelationalOperator');
```

Create a filter object, create a rule, and add the rule to the filter.

```
filt = slcoverage.Filter;
rule = slcoverage.FilterRule(bl, 'Tested elsewhere', slcoverage.FilterMode.Exclude);
filt.addRule(rule);
```

After you create a filter and add one or more rules to it, save the filter to a file. Simulate the model for code coverage. Add the filter file as the value to the `filter` property of the resulting `cvdata` object.

```
filt.save('blfilter');
csim = cvsim(modelName);
csim.filter = 'blfilter';
cvhtml('cov', csim);
```

Examine the HTML report and notice the rules that were added for the blocks. The coverage report shows the excluded blocks and the rationale.

Use Multiple Filter Files for a Simulation

This example assumes that you have two existing filter files, `myfilt1.cvf` and `myfilt2.cvf`. Simulate the model for coverage. Add the filter files to the `filter` property of the resulting `cvdata` object.

```
csim = cvsim(modelName);
csim.filter = {'myfilt1', 'myfilt2'};
cvhtml('cov', csim);
```

Add Rule to a Filter File

This example assumes that you have an existing filter file `myfilt.cvf` that you want to add a rule to. Create a filter object that uses that file. Add a rule to the filter object and then save the file again.

```
filt = slcoverage.Filter('myfilt');
bl = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockInstance, 'sldemo_lct_bus:23');

rule = slcoverage.FilterRule(bl, 'Edge case');
filt.addRule(rule);
filt.save('myfilt')
```

See Also

[slcoverage.BlockSelector](#) | [slcoverage.FilterRule](#) | [slcoverage.MetricSelector](#) | [slcoverage.SFcnSelector](#)

Topics

“Create, Edit, and View Coverage Filter Rules”

Introduced in R2017b

slcoverage.FilterRule class

Package: slcoverage

Create coverage filtering rule

Description

Create a coverage filtering rule that includes the selector and the rationale for filtering.

Construction

`rule = slcoverage.FilterRule(selector, rationale)` creates the filter rule object `rule` using the specified selector and rationale text.

`rule = slcoverage.FilterRule(selector, rationale, mode)` specifies whether the filter mode for this rule is justify or exclude. You can use only justify (the default) with metric selectors.

Input Arguments

selector — Selector for this rule

`slcoverage.BlockSelector` object | `slcoverage.MetricSelector` object | `slcoverage.SFcnSelector` object

Selector that determines the objects that this rule applies to, specified as an `slcoverage.BlockSelector` object, `slcoverage.MetricSelector` object, or `slcoverage.SFcnSelector` object.

rationale — Reason for adding the rule

character vector or string

Reason for adding the rule, specified as a character vector or string.

Example: 'value is never less than 0'

mode — Filter mode

`slcoverage.FilterMode.Justify` (default) | `slcoverage.FilterMode.Exclude`

Filter mode for this rule, specified as `slcoverage.FilterMode.Justify` or `slcoverage.FilterMode.Exclude`.

Properties

Mode — Filter mode

`Justify` (default) | `Exclude`

This property is read-only.

Filter mode that was specified for this rule, returned as `Justify` or `Exclude`.

Rationale — Rationale text specified for this rule

character vector or string

This property is read-only.

Rationale text specified for this rule, returned as a character vector.

Selector — Selector object for this rule

slcoverage.BlockSelector object | slcoverage.MetricSelector object |
slcoverage.SFcnSelector object

This property is read-only.

Selector object for this rule, returned as a slcoverage.BlockSelector object, slcoverage.SFcnSelector object, or slcoverage.SFcnSelector object.

Copy Semantics

Handle. To learn how handle classes affect copy operations, see Copying Objects.

Examples

Create Rule That Uses a Block Selector

Create a block selector object and a rule for it. Then add the rule to a filter.

Open the model. Specify coverage settings and turn on coverage recording.

```
modelName = 'sldemo_lct_bus';
open_system(modelName);
set_param(modelName, 'CovMetricSettings', 'dcme', 'RecordCoverage', 'on');
```

Select blocks with block type 'RelationalOperator' to add a filter rule for.

```
bl = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockType, 'RelationalOperator');
```

Create a filter object, create a rule, and add the rule to the filter. This rule excludes the selection from coverage analysis.

```
filt = slcoverage.Filter;
rule = slcoverage.FilterRule(bl, 'Tested elsewhere', slcoverage.FilterMode.Exclude);
filt.addRule(rule);
```

See Also

slcoverage.BlockSelector | slcoverage.Filter | slcoverage.MetricSelector |
slcoverage.SFcnSelector

Topics

“Coverage Filter Rules and Files”

“Create, Edit, and View Coverage Filter Rules”

Introduced in R2017b

slcoverage.MetricSelector class

Package: slcoverage

Select metric criterion for coverage filter

Description

Use an object of the `slcoverage.MetricSelector` class to specify metric selection criteria for a coverage filter rule.

The `slcoverage.MetricSelector` class is a `handle` class.

Construction

`sel = slcoverage.MetricSelector(type, element, objIndex, outIndex)` creates a metric selector object of type `type` for the specified model element `element` at the objective index `objIndex` and outcome index `outIndex`.

You can only create a justify rule for a metric selector. For more information about the difference between justification and exclusion, see “Coverage Filtering”.

For more information on the condition and decision coverage tables produced in the report, see “Top-Level Model Coverage Report”.

Input Arguments

type — Metric selector type

```
slcoverage.MetricSelectorType.ConditionOutcome |  
slcoverage.MetricSelectorType.DecisionOutcome |  
slcoverage.MetricSelectorType.MCDCOutcome |  
slcoverage.MetricSelectorType.RelationalBoundaryOutcome |  
slcoverage.MetricSelectorType.SaturationOverflowOutcome
```

Metric selector type, specified as:

- `slcoverage.MetricSelectorType.ConditionOutcome` objects select condition metric objective outcomes.
- `slcoverage.MetricSelectorType.DecisionOutcome` objects select decision metric objective outcomes.
- `slcoverage.MetricSelectorType.MCDCOutcome` objects select MCDC metric objective outcomes.
- `slcoverage.MetricSelectorType.RelationalBoundaryOutcome` objects select outcome metrics related to relational boundary outcomes.
- `slcoverage.MetricSelectorType.SaturationOverflowOutcome` objects select outcome metrics related to saturation on integer overflow outcomes.

element — Model element to select

`handle` | Simulink ID

Model element to select, specified as a `handle` or the Simulink identifier of the model element.

Example: 'sldemo_lct_bus:18'

objIndex — Index of objective

integer

Index of the objective that you want to filter, specified as an integer.

Example: 1

outIndex — Index of outcome

integer

Index of the outcome that you want to filter, specified as an integer.

Example: 2

Properties

ConstructorCode — Code used to create this selector object

character vector

This property is read-only.

Code used to create this selector object, returned as a character vector.

Description — Description of the selector

character vector

This property is read-only.

Description of the selector, returned as a character vector. Simulink Coverage creates the description based on the selector.

Id — Element identifier

Simulink ID (default) | handle

This property is read-only.

Identifier of the model element, returned as character vector of the Simulink ID or a handle.

ObjectiveIndex — Index of objective

integer

This property is read-only.

Index of the objective for this selector, returned as an integer.

OutcomeIndex — Index of outcome

integer

This property is read-only.

Index of the outcome for this selector, returned as an integer.

Type — Metric selector type

ConditionOutcome | DecisionOutcome | MCDCOutcome | RelationalBoundaryOutcome | SaturationOverflowOutcome

This property is read-only.

Selector type, returned as ConditionOutcome, DecisionOutcome, MCDCOutcome, RelationalBoundaryOutcome, or SaturationOverflowOutcome.

Outputs**sel — Selector object**

slcoverage.MetricSelector object | array of slcoverage.MetricSelector objects

Selector object, returned as an slcoverage.MetricSelector object or array of slcoverage.MetricSelector objects.

Methods**Public Methods**

allSelectors Selectors for model or code element

Examples**Add Metric Selector Rule to a Filter**

This example shows how to select a metric and add a rule that uses that metric. In this example, you create a rule to justify an unsatisfied decision for a Saturation block.

Move the current MATLAB® directory to the location that contains the example files.

```
openExample('slcoverage/AddMetricSelectorRuleToAFilterExample');
```

Open the Model and Enable Coverage Analysis

Load the model into memory.

```
modelName = 'slvndemo_covfilt';  
load_system(modelName);
```

Use a Simulink.SimulationInput object to configure coverage for the model.

```
covSet = Simulink.SimulationInput(modelName);  
covSet = covSet.setModelParameter('CovEnable', 'on');  
covSet = covSet.setModelParameter('CovMetricStructuralLevel', 'MCDC');  
covSet = covSet.setModelParameter('CovSFcnEnable', 'on');  
covSet = covSet.setModelParameter('StopTime', '20');  
covSet = covSet.setModelParameter('CovSaveSingleToWorkspaceVar', 'on');  
covSet = covSet.setModelParameter('CovSaveName', 'covData');
```

Simulate the model using the SimulationInput object as the input.

```
simOut = sim(covSet);
```

View the coverage results before applying a filter. You can access the coverage using `decisioninfo`, or you can view the HTML report using `cvhtml`.

```
covInitial = decisioninfo(covData,[modelName, '/Saturation']);
percentInitial = 100 * covInitial(1)/covInitial(2)
```

```
percentInitial =
```


```
    50
```

```
cvhtml('covReportInitial',covData)
```

Saturate block "[Saturation](#)"



[Justify or Exclude](#)

Parent: [/slvndemo_covfilt](#)

Uncovered Links: 

Metric	Coverage
Cyclomatic Complexity	2
Decision	50% (2/4) decision outcomes
Execution	100% (1/1) objective outcomes

Decisions analyzed

input > lower limit	50%
false	0/201 
true	201/201
input >= upper limit	50%
false	201/201
true	0/201 

Both `decisioninfo` and `cvhtml` show the same result of 50% decision coverage. If you don't intend your current tests to exercise this outcome, you can justify the outcome so it is no longer reported as missing coverage.

In this example, we justify the `false` decision outcome of the `input > lower limit` decision objective in the `Saturation` block.

Justify the Missing Condition Objective

`MetricSelector` objects accept the block path or the block handle as the second input. Get the block handle of the Saturation block by using `getSimulinkBlockHandle`.

```
id = getSimulinkBlockHandle([modelName, '/Saturation']);
```

Because the objective being justified is a decision outcome, the first input to the metric selector constructor is `slcoverage.MetricSelectorType.DecisionOutcome`. The second input is the block handle. The last two are the index of the objective to justify and the index of the outcome of that objective, respectively.

Because the input `> lower limit` decision objective is the first objective for the Saturation block, its objective index is 1. Because the `false` outcome of this objective is the first outcome, its outcome index is also 1. Therefore, the last two inputs are 1, 1.

```
metr = slcoverage.MetricSelector(slcoverage.MetricSelectorType.DecisionOutcome, id, 1, 1);
```

Create a filter and rule. In this case, we use the default filter mode of justify. Then add the rule to the filter using the `addRule` method.

```
filt = slcoverage.Filter;
rule = slcoverage.FilterRule(metr, 'Expected result');
filt.addRule(rule);
```

Save the filter to a filter file using the `save` method. Then apply the filter file to the `cvdata` object by assigning the `filter` property to the new filter file.

```
filt.save('metrfilter');
covData.filter = 'metrfilter';
```

Re-generate the coverage results for the Saturation block using the new filtered `cvdata` object.

```
covFiltered = decisioninfo(covData, [modelName, '/Saturation']);
percentInitial = 100 * covFiltered(1)/covFiltered(2)
```

```
percentInitial =
```


```
    75
```

```
cvhtml('covReportFiltered', covData)
```


Saturate block "[Saturation](#)"


[Justify or Exclude](#)

Parent: [/slvndemo_covfilt](#)

Uncovered Links: 

Metric	Coverage
Cyclomatic Complexity	2
Decision	75% ((2+1)/4) decision outcomes
Execution	100% (1/1) objective outcomes

Decisions analyzed

input > lower limit	100%
false	J1
true	201/201
input >= upper limit	50%
false	201/201
true	0/201 

In the HTML report, the missing decision outcome is highlighted to indicate that it is justified. Decision coverage for the Saturation block is now 75%.

See Also

[getSimulinkBlockHandle](#) | [slcoverage.BlockSelector](#) | [slcoverage.Filter](#) | [slcoverage.FilterRule](#) | [slcoverage.SFcnSelector](#)

Topics

"Top-Level Model Coverage Report"

"Simulink Identifiers"

"Create, Edit, and View Coverage Filter Rules"

Introduced in R2017b

slcoverage.Selector class

Package: slcoverage

Get selectors of all types

Description

Use the `slcoverage.Selector` class with the `allSelectors` method to return all types of the selectors for a block.

Properties

ConstructorCode — Code used to create this selector object

character vector

This property is read-only.

Code used to create this selector object, returned as a character vector.

Description — Description of the selector

character vector

This property is read-only.

Description of the selector, returned as a character vector. Simulink Coverage creates the description based on the selector.

Id — Element identifier

Simulink ID (default) | handle

This property is read-only.

Identifier of the model element, returned as character vector of the Simulink ID or a handle.

Type — Selector type

selector type value

This property is read-only.

Selector type, returned as a selector type of the corresponding selector.

Methods

`allSelectors` Selectors for model or code element

Copy Semantics

Handle. To learn how handle classes affect copy operations, see [Copying Objects](#).

Examples

Get All Selectors

This example shows how to get all the selectors for an And block and then add a rule to justify or exclude a selector. Metric selectors can only be justified.

Move the current MATLAB® directory to the location that contains the example files.

```
openExample('slcoverage/GetAllSelectorsExample');
```

Load the model and set coverage settings

```
modelName = 'slvndemo_covfilt';
load_system(modelName);
set_param(modelName, 'CovEnable', 'on', 'CovMetricSettings', 'dcme');
```

First, get the block handle for the And block.

```
id = getSimulinkBlockHandle([modelName, '/Saturation']);
```

Get the selectors using the block handle.

```
sel = slcoverage.Selector.allSelectors(id)
```

```
sel =
```

```
1x10 heterogeneous Selector (BlockSelector, MetricSelector) array with properties:
```

```
    Description
    Type
    Id
    ConstructorCode
```

The block has eight selectors. You can index into each one to see their contents. In this example, you want to justify the sixth selector.

```
sel(6)
```

```
ans =
```

```
MetricSelector with properties:
```

```
    ObjectiveIndex: 2
    OutcomeIndex: 2
    Description: 'T outcome of input >= upper limit in Saturate block "Saturation"'
    Type: DecisionOutcome
    Id: 'slvndemo_covfilt:5'
    ConstructorCode: 'slcoverage.MetricSelector(slcoverage.MetricSelectorType.DecisionOutcome, ';
```

Create a justify rule, then create a filter object and add the rule to it.

```
rule = slcoverage.FilterRule(sel(6), 'Expected result');
filt = slcoverage.Filter;
filt.addRule(rule);
```

Save the filter and generate a coverage report.

```
filt.save('metrfilter');  
csim = cvsim(modelName);  
csim.filter = 'metrfilter';  
cvhtml('cov',csim,'-SRT=0');
```

See Also

slcoverage.BlockSelector | slcoverage.CodeSelector | slcoverage.MetricSelector |
slcoverage.SFcnSelector

Topics

“Create, Edit, and View Coverage Filter Rules”

Introduced in R2017b

slcoverage.SFcnSelector class

Package: slcoverage

Select S-function criterion for filtering rule

Description

Specify S-function selection criteria for a filter rule.

Construction

`sel = slcoverage.SFcnSelector(type,element)` specifies the type of selector to use for the selected model element.

`sel = slcoverage.SFcnSelector(type,element,file)` creates the selector based on the specified C or C++ file.

`sel = slcoverage.SFcnSelector(type,element,file,function)` creates the selector based on the specified C or C++ function in the specified file.

`sel = slcoverage.SFcnSelector(type,element,file,function, expression,index)` creates the selector based on the specified index of the specified decision expression.

Input Arguments

type — Type of S-function

`slcoverage.SFcnSelectorType` value

Type of S-function to select, specified as one of these values:

- `slcoverage.SFcnSelectorType.SFcnName` selects the specified S-function.
- `slcoverage.SFcnSelectorType.SFcnInstanceCppFileName` selects the coverage data in the generated code file for this block. Use with the `file` argument.
- `slcoverage.SFcnSelectorType.SFcnInstanceCppFunction` selects an instance of a C or C++ function. Use with the `file` and `function` arguments.
- `slcoverage.SFcnSelectorType.SFcnInstanceCppCondition` selects a condition outcome of the specified code. Use with `file`, `function`, `expression`, and `index` arguments.
- `slcoverage.SFcnSelectorType.SFcnInstanceCppDecision` selects a decision outcome of the specified. Use with `file`, `function`, `expression`, and `index` arguments.

element — Model element to select

`property name | handle | Simulink ID`

Model element to select, specified as a property name of the element, its handle, or its Simulink identifier. Use a handle or ID for selector types that select an instance. Use a property name, such as the value of a block's 'BlockType' property, to select multiple model elements.

Example: 'sldemo_lct_bus:18', 'RelationalOperator'

file — C or C++ file to select

character vector or string

C or C++ file to select, specified as a character vector or string.

Example: 'myfile.c'

function — C or C++ function to select

character vector or string

C or C++ function to select, specified as a character vector or string.

Example: 'counterbusFcn'

expression — Decision expression to select

character vector or string

Decision expression to select, specified as a character vector or string.

Example: 'inputGElower'

index — Matrix position of expression to select

integer

Matrix position of expression to select, specified as an integer.

Example: 2

Outputs

sel — Selector object

slcoverage.SFcnSelector object | array of slcoverage.SFcnSelector objects

Selector object, returned as an slcoverage.SFcnSelector object or array of slcoverage.SFcnSelector objects.

Properties

ConstructorCode — Code used to create this selector object

character vector

This property is read-only.

Code used to create this selector object, returned as a character vector.

Description — Description of the selector

character vector

This property is read-only.

Description of the selector, returned as a character vector. Simulink Coverage creates the description based on the selector.

Expr — Decision expression for this selector

character vector or string

This property is read-only.

Decision expression for this selector, returned as a character vector.

FileName — C or C++ file for selector

character vector or string

This property is read-only.

C or C++ file for selector, returned as a character vector or string.

FunctionName — C or C++ function name for selector

character vector or string

This property is read-only.

C or C++ function name for this selector, returned as a character vector.

Id — Element identifier

Simulink ID (default) | property | handle

This property is read-only.

Identifier of the model element, returned as character vector of the Simulink ID, model element property, or handle. This property is empty for the `slcoverage.CodeSelector` class.

Type — Selector type

`slcoverage.SFcnSelectorType` value

Selector type, returned as one of these `slcoverage.SFcnSelectorType` values:

- `SFcnName`
- `SFcnInstanceCppFileName`
- `SFcnInstanceCppFunction`
- `SFcnInstanceCppCondition`
- `SFcnInstanceCppDecision`

Methods

`allSelectors` Selectors for model or code element

Copy Semantics

Handle. To learn how handle classes affect copy operations, see [Copying Objects](#).

Examples

Create an S-Function Selector

This example shows how to create an S-Function Selector.

Start by loading the model by using `load_system`.

```
load_system('slvndemo_covfilt');
```

Create an S-Function selector by using `slcoverage.SFcnSelector`. The first input is the selector type, `slcoverage.SFcnSelectorType.SFcnName`. The second input is the path to the S-Function.

```
sel = slcoverage.SFcnSelector(slcoverage.SFcnSelectorType.SFcnName, ...  
                             'slvndemo_covfilt/Mode Logic/ SFunction ')
```

```
sel =
```

```
    SFcnSelector with properties:
```

```
        FileName: ''  
        FunctionName: ''  
        Expr: ''  
        Description: 'N/A'  
        Type: SFcnName  
        Id: 'slvndemo_covfilt:6::43'  
        ConstructorCode: 'slcoverage.SFcnSelector(slcoverage.SFcnSelectorType.SFcnName, 'slvndemo_c
```

See Also

`cv.cvdatagroup` | `getSimulinkBlockHandle` | `slcoverage.BlockSelector` | `slcoverage.Filter` | `slcoverage.FilterRule` | `slcoverage.MetricSelector`

Topics

“Top-Level Model Coverage Report”

“Simulink Identifiers”

“Create, Edit, and View Coverage Filter Rules”

Introduced in R2017b

addRule

Class: slcoverage.Filter

Package: slcoverage

Add coverage filtering rule to filter

Syntax

```
result = addRule(filter,rule)
```

Description

`result = addRule(filter,rule)` adds the filter rule to the specified filter.

Input Arguments

filter — Filter object to add the rule to

slcoverage.Filter object

Filter object to add the rule to, specified as an slcoverage.Filter object.

rule — Rule to add to the filter

slcoverage.FilterRule object

Rule to add to the filter, specified as an slcoverage.FilterRule object.

Output Arguments

result — Rule addition result

logical

Rule addition result, returned as 0 or 1.

Examples

Add Rule to Filter Object

Create a block selector, a filter, and a rule for the selector. Then add the rule to the filter.

Open the model. Specify coverage settings and turn on coverage recording.

```
modelName = 'sldemo_lct_bus';
open_system(modelName);
set_param(modelName, 'CovMetricSettings', 'dcme', 'RecordCoverage', 'on');
```

Create a BlockSelector object, bl. This block selector selects all blocks in the model with the property 'RelationalOperator'.

```
bl = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockType, 'RelationalOperator');
```

Create a filter object, create a rule object, and add the rule to the filter object.

```
filt = slcoverage.Filter;  
rule = slcoverage.FilterRule(bl, 'Tested elsewhere', slcoverage.FilterMode.Exclude);  
filt.addRule(rule);
```

See Also

[removeRule](#) | [slcoverage.BlockSelector](#) | [slcoverage.Filter](#) | [slcoverage.FilterRule](#) | [slcoverage.MetricSelector](#) | [slcoverage.SFcnSelector](#)

Introduced in R2017b

removeRule

Class: slcoverage.Filter

Package: slcoverage

Remove rule from filter rule set

Syntax

```
result = removeRule(filter,rule)
```

Description

`result = removeRule(filter,rule)` removes the filter rule from the specified filter.

Input Arguments

filter — Filter object to remove rule from

slcoverage.Filter object

Filter object to remove the rule from, specified as an slcoverage.Filter object.

rule — Rule to remove from the filter

slcoverage.FilterRule object

Rule to remove from the filter, specified as an slcoverage.FilterRule object.

Output Arguments

result — Rule removal result

logical

Rule removal result, returned as 0 or 1.

Examples

Remove Rules from Filter Objects

Create a block selector, a filter, and a rule for the selector. Add rules to the filter. Then, remove a rule from a filter.

Open the model. Specify coverage settings and turn on coverage recording.

```
modelName = 'sldemo_lct_bus';  
open_system(modelName);  
set_param(modelName, 'CovMetricSettings', 'dcme', 'RecordCoverage', 'on');
```

Create two BlockSelector objects, bl and bl1.

```
bl = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockType, 'RelationalOperator');  
id = Simulink.ID.getSID('sldemo_lct_bus/slCounter/And');  
bl1 = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockInstance, id);
```

Create a filter object, create two rule objects, and add each rule to the filter object.

```
filt = slcoverage.Filter;  
rule = slcoverage.FilterRule(bl, 'Tested elsewhere', slcoverage.FilterMode.Exclude);  
rule1 = slcoverage.FilterRule(bl1, 'Value is never greater than 0');  
filt.addRule(rule);  
filt.addRule(rule1);
```

Review the rules. Look the first rule in the array.

```
fi = filt.rules  
fi(1)
```

```
fi =
```

```
1x2 FilterRule array with properties:
```

```
Selector  
Mode  
Rationale
```

```
ans =
```

```
FilterRule with properties:
```

```
Selector: [1x1 slcoverage.BlockSelector]  
Mode: Exclude  
Rationale: 'Tested elsewhere'
```

Remove the first rule that you added. Then review the rules to see that the first rule that you added is removed.

```
filt.removeRule(rule);  
fi = filt.rules
```

```
fi =
```

```
FilterRule with properties:
```

```
Selector: [1x1 slcoverage.BlockSelector]  
Mode: Justify  
Rationale: 'Value is never greater than 0'
```

See Also

[addRule](#) | [slcoverage.Filter](#) | [slcoverage.FilterRule](#) | [slcoverage.filter.rules](#)

Introduced in R2017b

rules

Class: slcoverage.Filter

Package: slcoverage

Rules for filter

Syntax

```
fr = rules(filter)
fr = rules(filter,element)
```

Description

`fr = rules(filter)` returns all the rules assigned to the filter.

`fr = rules(filter,element)` returns only the rules for the specified model element.

Input Arguments

filter — Filter object whose rules to return

slcoverage.Filter object

Filter object whose rules to return, specified as an slcoverage.Filter object.

element — Element identifier

Simulink ID | property | handle

This property is read-only.

Identifier of the model element whose rules to return, specified as a character vector or string of the Simulink ID, model element property, or handle.

Output Arguments

fr — Filter rules

slcoverage.FilterRule object | array of slcoverage.FilterRule objects

Filter rules, returned as an slcoverage.FilterRule object or an array of slcoverage.FilterRule objects.

Examples

Get All Rules for Filter Object

Open a model. Specify coverage settings and turn on coverage recording.

```
modelName = 'sldemo_lct_bus';
open_system(modelName);
set_param(modelName, 'CovMetricSettings', 'dcme', 'RecordCoverage', 'on');
```

Create a BlockSelector object, bl. Create a filter object, create a rule, and add the rule to the filter.

```
bl = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockType, 'RelationalOperator');
filt = slcoverage.Filter;
rule = slcoverage.FilterRule(bl, 'Tested elsewhere', slcoverage.FilterMode.Exclude);
filt.addRule(rule);
```

Create another rule and add it to the filter object.

```
id = Simulink.ID.getSID('sldemo_lct_bus/slCounter/And');
bl = slcoverage.BlockSelector(slcoverage.BlockSelectorType.BlockInstance, id);
rule = slcoverage.FilterRule(bl, 'Value is never greater than 0');
filt.addRule(rule);
```

Use rules to return the filter rules. View first rule in the array.

```
fi = filt.rules
fi(1)
```

```
fi =
```

```
1x2 FilterRule array with properties:
```

```
Selector
Mode
Rationale
```

```
ans =
```

```
FilterRule with properties:
```

```
Selector: [1x1 slcoverage.BlockSelector]
Mode: Exclude
Rationale: 'Tested elsewhere'
```

Use rules to return the rule only for the And block.

```
filt.rules(id)
```

```
ans =
```

```
FilterRule with properties:
```

```
Selector: [1x1 slcoverage.BlockSelector]
Mode: Justify
Rationale: 'Value is never greater than 0'
```

See Also

[addRule](#) | [removeRule](#) | [slcoverage.Filter](#) | [slcoverage.FilterRule](#)

Introduced in R2017b

allSelectors

Class: slcoverage.BlockSelector, slcoverage.CodeSelector, slcoverage.Selector, slcoverage.MetricSelector, slcoverage.SFcnSelector

Package: slcoverage

Selectors for model or code element

Syntax

```
sel = slcoverage.Selector.allSelectors(element)
sel = slcoverage.BlockSelector.allSelectors(element)
sel = slcoverage.CodeSelector.allSelectors(element)
sel = slcoverage.CodeSelector.allSelectors(element,Name,Value)
sel = slcoverage.MetricSelector.allSelectors(element)
sel = slcoverage.SFcnSelector.allSelectors(element)
sel = slcoverage.Selector.allSelectors(element,Name,Value)
```

Description

`sel = slcoverage.Selector.allSelectors(element)` returns all the selectors for the model element.

`sel = slcoverage.BlockSelector.allSelectors(element)` returns all the block selectors for element.

`sel = slcoverage.CodeSelector.allSelectors(element)` returns all the custom C/C++ code selectors for element.

`sel = slcoverage.CodeSelector.allSelectors(element,Name,Value)`, where `element` is a model and `Name,Value` specifies the simulation mode, returns all the custom C/C++ code selectors for the model in the specified simulation mode.

`sel = slcoverage.MetricSelector.allSelectors(element)` returns all the metric selectors for element.

`sel = slcoverage.SFcnSelector.allSelectors(element)` returns all the S-function selectors for element.

`sel = slcoverage.Selector.allSelectors(element,Name,Value)` returns selectors for element, with additional options specified by one or more `Name,Value` pair arguments.

Input Arguments

element — Model element to select

handle | Simulink ID

Model element to select, specified as a handle or the model element Simulink identifier.

Example: 'sldemo_lct_bus:18'

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

Example: `'Type', slcoverage.BlockSelectorType.BlockInstance, 'Description', 'F outcome'`

Type — Selector type refinement

`slcoverage.BlockSelectorType value | slcoverage.CodeSelectorType value | slcoverage.MetricSelectorType value | slcoverage.SFcnSelectorType value`

Selector type refinement specified as one of the `slcoverage.BlockSelectorType`, `slcoverage.CodeSelectorType`, `slcoverage.MetricSelectorType`, or `slcoverage.SFcnSelectorType` values. Possible values:

- Block selector types:
 - `slcoverage.BlockSelectorType.BlockInstance` — An instance of a block.
 - `slcoverage.BlockSelectorType.BlockType` — All blocks of the specified block type.
 - `slcoverage.BlockSelectorType.Chart` — A Stateflow chart.
 - `slcoverage.BlockSelectorType.MaskType` — Blocks that use the specified mask type.
 - `slcoverage.BlockSelectorType.State` — A Stateflow state.
 - `slcoverage.BlockSelectorType.StateAllContent` — Stateflow state and its contents.
 - `slcoverage.BlockSelectorType.StateflowFunction` — A Stateflow function.
 - `slcoverage.BlockSelectorType.Subsystem` — A subsystem block.
 - `slcoverage.BlockSelectorType.SubsystemAllContent` — A subsystem and its contents.
 - `slcoverage.BlockSelectorType.TemporalEvent` — A Stateflow temporal event.
 - `slcoverage.BlockSelectorType.Transition` — A Stateflow transition.
- Code selector types:
 - `slcoverage.CodeSelectorType.File` — Custom C/C++ code file name.
 - `slcoverage.CodeSelectorType.Function` — Custom C/C++ code function name.
 - `slcoverage.CodeSelectorType.Decision` — A custom C/C++ code decision.
 - `slcoverage.CodeSelectorType.Condition` — A custom C/C++ code condition.
- Metric selector types:
 - `slcoverage.MetricSelectorType.ConditionOutcome` objects select condition metric objective outcomes.
 - `slcoverage.MetricSelectorType.DecisionOutcome` objects select decision metric objective outcomes.
 - `slcoverage.MetricSelectorType.MCDCOutcome` objects select MCDC metric objective outcomes.
 - `slcoverage.MetricSelectorType.RelationalBoundaryOutcome` objects select outcome metrics related to relational boundary outcomes.

- `slcoverage.MetricSelectorType.SaturationOverflowOutcome` objects select outcome metrics related to saturation on integer overflow outcomes.
- S-function selector types:
 - `slcoverage.SFcnSelectorType.SFcnName` selects the specified S-function.
 - `slcoverage.SFcnSelectorType.SFcnInstanceCppFileName` selects the coverage data in the generated code file for this block.
 - `slcoverage.SFcnSelectorType.SFcnInstanceCppFunction` selects a function.
 - `slcoverage.SFcnSelectorType.SFcnInstanceCppCondition` selects a condition outcome of the S-function block.
 - `slcoverage.SFcnSelectorType.SFcnInstanceCppDecision` selects a decision outcome of the S-function block.

Description — Description text to match

character vector or string

Description text to match for the selector that you want to return, specified as a character vector or string. For example, if you want to return only the selectors that include the text `F outcome` in the description, use this syntax:

```
s = slcoverage.Selector.allSelectors(id, 'Description', 'F outcome')
```

SimulationMode — Simulation mode

character vector or string

Simulation mode to run when selecting code filters, entered as one of the following:

Object Specification	Description
'normal' (default)	Extract code selectors for custom code in normal simulation, such as custom code called from a C Caller block or a Stateflow chart.
'sil'	Extract code selectors for code generated in Simulation-in-the-Loop (SIL) mode and code selectors for the top model code interface
'pil'	Extract code selectors for code generated in Processor-in-the-Loop (PIL) mode and code selectors for the top model code interface
'xil'	If SIL-mode code exists, extract code selectors for code generated in SIL mode and extract code selectors for the top model code interface; otherwise, extract code selectors for code generated in PIL mode and extract code selectors for the top model code interface
'modelrefsil'	Extract code selectors for the model reference code interface in SIL mode
'modelrefpil'	Extract code selectors for the model reference code interface in PIL mode

Object Specification	Description
'modelrefxil'	If SIL-mode code exists, extract code selectors for the model reference code interface in SIL mode, if the model is in SIL mode; otherwise, extract code selectors for the model reference code interface in PIL mode

Output Arguments

sel — Selectors for the model or code element

array of `Selector` objects

Selectors for the model or code element, returned as an array of `Selector` objects.

Examples

Get All Selectors

This example shows how to get all the selectors for an And block and then add a rule to justify or exclude a selector. Metric selectors can only be justified.

Move the current MATLAB® directory to the location that contains the example files.

```
openExample('slcoverage/GetAllSelectorsExample');
```

Load the model and set coverage settings

```
modelName = 'slvndemo_covfilt';
load_system(modelName);
set_param(modelName, 'CovEnable', 'on', 'CovMetricSettings', 'dcme');
```

First, get the block handle for the And block.

```
id = getSimulinkBlockHandle([modelName, '/Saturation']);
```

Get the selectors using the block handle.

```
sel = slcoverage.Selector.allSelectors(id)
```

```
sel =
```

1x10 heterogeneous `Selector` (`BlockSelector`, `MetricSelector`) array with properties:

```
Description
Type
Id
ConstructorCode
```

The block has eight selectors. You can index into each one to see their contents. In this example, you want to justify the sixth selector.

```
sel(6)
```

```
ans =
```

```
MetricSelector with properties:
```

```
ObjectiveIndex: 2
OutcomeIndex: 2
Description: 'T outcome of input >= upper limit in Saturate block "Saturation"'
Type: DecisionOutcome
Id: 'slvndemo_covfilt:5'
ConstructorCode: 'slcoverage.MetricSelector(slcoverage.MetricSelectorType.DecisionOutcome, 's
```

Create a justify rule, then create a filter object and add the rule to it.

```
rule = slcoverage.FilterRule(sel(6), 'Expected result');
filt = slcoverage.Filter;
filt.addRule(rule);
```

Save the filter and generate a coverage report.

```
filt.save('metrfilter');
csim = cvsim(modelName);
csim.filter = 'metrfilter';
cvhtml('cov', csim, '-sRT=0');
```

Get Selector by Type and Description

This example shows how to get a selector by type and description. In this example, you get all selectors for the False outcomes of the And block whose type is ConditionOutcome.

Load the model into memory.

```
modelName = 'sldemo_lct_bus';
load_system(modelName);
```

Get the false outcome condition selectors for the And block by searching for descriptions that include F.

```
id = getSimulinkBlockHandle([modelName, '/slCounter/And']);
sel = slcoverage.Selector.allSelectors(id, ...
    'Type', slcoverage.MetricSelectorType.ConditionOutcome, ...
    'Description', 'F')
```

```
sel =
```

```
1x2 MetricSelector array with properties:
```

```
ObjectiveIndex
OutcomeIndex
Description
Type
Id
ConstructorCode
```

Look at the constructor code for the two selectors that were returned.

```
sel.ConstructorCode
```

```
ans =
```

```
    'slcoverage.MetricSelector(slcoverage.MetricSelectorType.ConditionOutcome, 'sldemo_lct_bus:2
```

```
ans =
```

```
    'slcoverage.MetricSelector(slcoverage.MetricSelectorType.ConditionOutcome, 'sldemo_lct_bus:2
```

See Also

[slcoverage.BlockSelector](#) | [slcoverage.CodeSelector](#) | [slcoverage.MetricSelector](#) | [slcoverage.SFcnSelector](#) | [slcoverage.Selector](#)

Introduced in R2017b