

# **Simulink<sup>®</sup> Control Design Release Notes**

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## Summary by Version

This table provides quick access to what's new in each version. For clarification, see “About Release Notes” on page 1.

<b>Version (Release)</b>	<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
<b>Latest Version V2.0 (R2006a)</b>	Yes Details	No	Bug Reports at Web site	Printable Release Notes: PDF  V2.0 product documentation
V1.3 (R14SP3)	Yes Details	No	Bug Reports at Web site	No
V1.2 (R14SP2)	Yes Details	No	Bug Reports at Web site	No
V1.1 (R14SP1)	No	No	Fixed bugs	No
V1.0 (R14)	Yes Details	No	No bug fixes	No

### About Release Notes

Use release notes when upgrading to a newer version to learn about new features and changes, and the potential impact on your existing files and practices. Release notes are also beneficial if you use or support multiple versions.

If you are not upgrading from the most recent previous version, review release notes for all interim versions, not just for the version you are installing. For example, when upgrading from V1.0 to V1.2, review the New Features and Changes, Version Compatibility Considerations, and Bug Reports for V1.1 and V1.2.

## New Features and Changes

These include

- New functionality
- Changes to existing functionality
- Changes to system requirements (complete system requirements for the current version are at the MathWorks Web site)
- Any version compatibility considerations associated with each new feature or change

## Version Compatibility Considerations

When a new feature or change introduces a known incompatibility between versions, its description includes a **Compatibility Considerations** subsection that details the impact. For a list of all new features and changes that have compatibility impact, see the “Compatibility Summary for Simulink Control Design” on page 12.

Compatibility issues that become known after the product has been released are added to Bug Reports at the MathWorks Web site. Because bug fixes can sometimes result in incompatibilities, also review fixed bugs in Bug Reports for any compatibility impact.

## Fixed Bugs and Known Problems

MathWorks Bug Reports is a user-searchable database of known problems, workarounds, and fixes. The MathWorks updates the Bug Reports database as new problems and resolutions become known, so check it as needed for the latest information.

Access Bug Reports at the MathWorks Web site using your MathWorks Account. If you are not logged in to your MathWorks Account when you link to Bug Reports, you are prompted to log in or create an account. You then can view bug fixes and known problems for R14SP2 and more recent releases.

The Bug Reports database was introduced for R14SP2 and does not include information for prior releases. You can access a list of bug fixes made in prior versions via the links in the summary table.

## **Related Documentation at Web Site**

**Printable Release Notes (PDF).** You can print release notes from the PDF version, located at the MathWorks Web site. The PDF version does not support links to other documents or to the Web site, such as to Bug Reports. Use the browser-based version of release notes for access to all information.

**Product Documentation.** At the MathWorks Web site, you can access complete product documentation for the current version and some previous versions, as noted in the summary table.

## Version 2.0 (R2006a) Simulink Control Design

This table summarizes what's new in Version 2.0 (R2006a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	Printable Release Notes: PDF  V2.0 product documentation

New features and changes introduced in this version are described here:

### Compensator Design in Simulink Is Now Supported

This release provides new tools to streamline the workflow for designing Single-Input Single-Output (SISO) control loops directly in Simulink. In previous releases, designing a compensator was a multistep process that involved several tools.

The new tools support any linearizable control architecture, such as single loops, multiple loops, and cascaded loops. With the new tools, you simply select the blocks you want to tune. Then, Simulink Control Design automatically analyzes your model to identify the relevant control loops and opens a preconfigured session of the SISO Design Tool (in the Control System Toolbox). For more information, see “Designing Compensators” in the Simulink Control Design Getting Started Guide.

Supported tunable SISO Simulink blocks include Gain, Transfer Function, Zero-Pole-Gain, State-Space, and PID blocks.

In the SISO Design Tool you can

- Graphically tune multiple SISO loops in a single GUI.
- Gain visual insight into loop interactions and coupling effects.



- Focus the analysis on a specific loop in a multiloop design by removing the effect of other feedback loops.
- Generate first-cut compensator designs using systematic design algorithms, such as Ziegler-Nichols PID tuning, IMC design, or LQG design.
- Optimize linear responses to meet time and frequency-based design constraints (requires Simulink Response Optimization).
- Directly tune Simulink block parameters, such as PID gains, zero-pole-gain representations, and masked blocks.
- Tune continuous or discrete control loops.
- Examine the closed-loop response of any portion of a model.

After a design is completed, you can write the tuned parameter values back to your Simulink model for verification with the full nonlinear system.

## Version 1.3 (R14SP3) Simulink Control Design

This table summarizes what's new in Version 1.3 (R14SP3):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	No

New features and changes introduced in this version are described here:

### Control and Estimation Tools Manager Enhanced

You can copy and edit operating points within the Control and Estimation Tools Manager. For more information on this feature, see “Copying Operating Points” in the Simulink Control Design User’s Guide.

You can initialize a Simulink model for simulation using operating points from within the Control and Estimation Tools Manager. For more information on this feature, see the example in “Comparing the Linearized and Original Models” in the Simulink Control Design User’s Guide.

### Support for Operating Point Search and Linearization of Models with Model Reference Blocks

You can linearize and compute operating points for models that reference other models using the Model block. Linearization of model reference models must use the numerical perturbation linearization algorithm. This algorithm accepts state and input perturbation values in the form of an operating point object. For more information on this feature, see the examples in “Example: Command-Line Numerical Perturbation Linearization of a Model Reference Model” and “Example: Using the Graphical Interface for Numerical Perturbation Linearization of a Model Reference Model” in the Simulink Control Design User’s Guide..

## Version 1.2 (R14SP2) Simulink Control Design

This table summarizes what's new in Version 1.2 (R14SP2):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	No

New features and changes introduced in this version are described here:

### Context-Sensitive Help Added

Access context-sensitive help for the Linearization, Operating Point Search, and Linearization State Ordering Options window of the Control and Estimation Tools Manager. To access help on a field within the options window, right-click the option's label and select **What's this?** from the context menu. Help for the option will appear in this window.

### View Linearizations in the Control and Estimation Tools Manager

You can view state space, transfer function, and zero-pole gain representations of linearized models within the Control and Estimation Tools Manager without exporting to the workspace. These linearized models appear in the linearization summary pane of the Control and Estimation Tools Manager.

### Discretization Methods Added

You can select from three different discretization methods for linearization of multirate and hybrid models.

### List of Blocks with Preprogrammed Analytic Jacobians Added

You can view a complete list of Simulink blocks indicating which blocks have preprogrammed analytic Jacobians for use with the block-by-block analytic

linearization algorithm. This list is in the “Individual Block Linearization Methods” section of the Simulink Control Design documentation.

### **Block Name Readability Improved**

You can use either truncated block names or full block names in the state space matrices of a linearized model, and within the LTI Viewer, to improve readability.

## Version 1.1 (R14SP1) Simulink Control Design

This table summarizes what's new in Version 1.1 (R14SP1):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>	<b>Related Documentation at Web Site</b>
No	No	Fixed bugs	No

## Version 1.0 (R14) Simulink Control Design

This table summarizes what's new in Version 1.0 (R14):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	No bug fixes	No

New features and changes introduced in this version are described here:

### About Simulink Control Design

Simulink Control Design provides tools for the linearization of control systems and physical models in Simulink. A graphical user interface (GUI) simplifies the tasks of specifying operating conditions, linearizing the model, and analyzing the results. Linearized Simulink models often facilitate system analysis and compensator design. This is useful in many industries and applications, including

- Aerospace: flight control, guidance, navigation
- Automotive: cruise control, emissions control, transmission
- Equipment manufacturing: motors, disk drives, servos

Simulink Control Design improves upon previous Simulink linearization tools by providing more options for computing operating conditions, allowing open loop analysis without the removal of feedback loops, and including a linearization inspector and debugger. Linearization projects are easier to manage with the new Control and Estimation Tools Manager. Furthermore, Control System Toolbox features, such as the LTI Viewer, are integrated with the Control Designer to improve control system analysis and design.

## Key Features Introduced

Key features of Simulink Control Design include the ability to

- Specify linearization input, output, and open loop analysis points using right-click menus
- Perform open loop analysis without deleting feedback loops
- Extract operating conditions from a simulation
- Compute operating conditions by optimization (trimming)
- Create output constraints for trim analysis
- Linearize individual blocks using context menus
- Inspect and debug results of the linearization
- Identify blocks in a model that contribute to a linearization
- Export results to the MATLAB workspace
- Manage linearization projects, compute operating conditions, and perform linearization with a graphical user interface (GUI)
- Use improved functions at the command line for linearization and trim analysis

## Compatibility Summary for Simulink Control Design

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided in the description of the new feature or change.

<b>Version (Release)</b>	<b>New Features and Changes with Version Compatibility Impact</b>
<b>Latest Version V2.0 (R2006a)</b>	None
V1.3 (R14SP3)	None
V1.2 (R14SP2)	None
V1.1 (R14SP1)	None
V1.0 (R14)	None