Simulink® Design Optimization™ Release Notes

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Simulink® Design Optimization™ Release Notes

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Contents

Summary by Version

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

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Latest Version V1.1.1 (R2010a)	No	No	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation
V1.1 (R2009b)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V1.0 (R2009a)	Yes Details	Yes Summary	Bug Reports Includes fixes	No

Using Release Notes

Use release notes when upgrading to a newer version to learn about:

- New features

- Changes

- Potential impact on your existing files and practices

Review the release notes for other MathWorks™ products required for this product (for example, MATLAB® or Simulink®). Determine if enhancements, bugs, or compatibility considerations in other products impact you.

If you are upgrading from a software version other than the most recent one, review the current release notes and all interim versions. For example, when you upgrade from V1.0 to V1.2, review the release notes for V1.1 and V1.2.

What Is in the Release Notes

New Features and Changes

- New functionality
- Changes to existing functionality

Version Compatibility Considerations

When a new feature or change introduces a reported incompatibility between versions, the **Compatibility Considerations** subsection explains the impact.

Compatibility issues reported after the product release appear under Bug Reports at The MathWorks™ Web site. Bug fixes can sometimes result in incompatibilities, so review the fixed bugs in Bug Reports for any compatibility impact.

Fixed Bugs and Known Problems

The MathWorks offers a user-searchable Bug Reports database so you can view Bug Reports. The development team updates this database at release time and as more information becomes available. Bug Reports include provisions for any known workarounds or file replacements. Information is available for bugs existing in or fixed in Release 14SP2 or later. Information is not available for all bugs in earlier releases.

Access Bug Reports using your MathWorks Account.

Version 1.1.1 (R2010a) Simulink Design Optimization Software

This table summarizes what's new in V 1.1.1 (R2010a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New Engine Design and Cost Tradeoffs Demo

The new Engine Design and Cost Tradeoffs demo shows how to use the Simulink® Design Optimization™ software to optimize a design for performance and cost.

Version 1.1 (R2009b) Simulink Design Optimization Software

This table summarizes what's new in V 1.1 (R2009b):

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

New features and changes introduced in this version are:

- "New Algorithm Option for fmincon (Gradient descent) and lsqnonlin (Nonlinear least squares) Methods, LargeScale (Model size) Option Removed" on page 4

- "Support for Optimization-Based Compensator Design for Plants with Delays or Specified as Frequency-Response Data" on page 6

- "Functions and Properties Being Removed" on page 6

New Algorithm Option for fmincon (Gradient descent) and lsqnonlin (Nonlinear least squares) Methods, LargeScale (Model size) Option Removed

This version of the product includes changes at the command line to make the fmincon and lsqnonlin methods to be consistent with the Optimization Toolbox™ software:

- Algorithm property renamed to Method.

- New Algorithm option.

- LargeScale option removed.

The following table summarizes values of the new Algorithm option.

Method	Algorithm **Values**
fmincon	• `'active-set'` (default) • `'trust-region-reflective'` • `'interior-point'`
lsqnonlin	• `'trust-region-reflective'` (default) • `'levenberg-marquardt'`

Previously, to specify the algorithm at the command line, you set the LargeScale option to `'on'` or `'off'`. If you used LargeScale=`'on'` in a previous release, use Algorithm=`'trust-region-reflective'` instead. If you used LargeScale=`'off'`, use the following instead:

• For fmincon – Use Algorithm=`'active-set'`.

• For lsqnonlin – Use Algorithm=`'levenberg-marquardt'`.

For more information about these options, see the *Optimization Toolbox User's Guide*.

The Options dialog box includes the following updates to the Gradient descent and Nonlinear least squares methods that correspond to the command-line changes.

• **Algorithm** option is renamed to **Method**.

• **Model size** option is deprecated and replaced by **Algorithm**.

When you load a saved project, the software uses the **Model size** value to update the **Algorithm** value automatically.

When you optimize parameters using the Gradient Descent method, an **Algorithm** value other than the default value of Active-Set can lead to a slightly different result.

For more information on how to specify the method and its algorithm, see "Specifying Estimation Options" and "Specifying Optimization Options".

Support for Optimization-Based Compensator Design for Plants with Delays or Specified as Frequency-Response Data

You can now use optimization-based compensator design for frequency-response data (FRD) plants or plants with exact time delays in the SISO Design Tool. For more information, see "Designing Optimization-Based Controllers for LTI Systems" and "Designing Linear Controllers for Simulink Models" in the *Simulink Design Optimization User's Guide*.

Functions and Properties Being Removed

For more information about the process of removing functions, see "Removal of Functions and Function Elements" in "What Is in the Release Notes" on page 2.

Function or Property Name	What Happens When You Use Function or Property?	Use This Instead	Compatibility Considerations
Algorithm	Errors	Method	See "New Algorithm Option for fmincon (Gradient descent) and lsqnonlin (Nonlinear least squares) Methods, LargeScale (Model size) Option Removed" on page 4
LargeScale	Errors	Algorithm	See "New Algorithm Option for fmincon (Gradient

Function or Property Name	What Happens When You Use Function or Property?	Use This Instead	Compatibility Considerations
			descent) and lsqnonlin (Nonlinear least squares) Methods, LargeScale (Model size) Option Removed" on page 4

Version 1.0 (R2009a) Simulink Design Optimization Software

This table summarizes what's new in V 1.0 (R2009a):

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

Note As of R2009a, Simulink® Parameter Estimation™ and Simulink® Response Optimization™ functionality are merged into a new product, Simulink Design Optimization. Simulink Parameter Estimation and Simulink Response Optimization are no longer available.

New features and changes introduced in this version are:

- "New Parallel Computing Support for Estimating Model Parameters" on page 8
- "Updated Demos" on page 9
- "Upgrading from Nonlinear Control Design Blockset Software" on page 9

New Parallel Computing Support for Estimating Model Parameters

If you have the Parallel Computing Toolbox™ software installed, you can use parallel computing to speed up estimating parameters of a Simulink model. The parallel computing option is available in the `Nonlinear least squares`, `Gradient descent` and `Pattern search` algorithms. You can enable this option from either the GUI or at the command line.

Using parallel computing can speed up the estimation time in the following situations:

- The model contains a large number of parameters to estimate.

- The model is complex and takes a long time to simulate.

For more information about using parallel computing for estimating model parameters, see "Speeding Up Parameter Estimation Using Parallel Computing" in the Simulink Design Optimization documentation.

Updated Demos

The Simulink Design Optimization demos have been categorized into the following new categories:

- Parameter Estimation in Simulink

- Response Optimization in Simulink

- Response Optimization in SISO Design Tool

- Design Optimization Using Parallel Computing

- Adaptive Lookup Tables

To open the Simulink Design Optimization demos, type

```
demo simulink 'simulink design optimization'
```

at the MATLAB prompt.

Upgrading from Nonlinear Control Design Blockset Software

Prior to R14, Simulink Response Optimization software was called Nonlinear Control Design Blockset software. If you are upgrading from Nonlinear Control Design Blockset software, your models will not work with Simulink Design Optimization software. To make the models compatible with Simulink Design Optimization software, use ncdupdate, as described in the documentation.

Compatibility Summary for Simulink Design Optimization Software

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.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V 1.1.1 (R2010a)	None
V 1.1 (R2009b)	See "Functions and Properties Being Removed" on page 6.
V 1.0 (R2009a)	See "Upgrading from Nonlinear Control Design Blockset Software" on page 9.