

# Simulink® Response Optimization Release Notes

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## **Printing the Release Notes**

If you would like to print the Release Notes, you can link to a PDF version.



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# Simulink Response Optimization 2.2 Release Notes

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## New Features

Simulink Response Optimization Version 2.2 introduces several new features:

- Manipulate signal constraints more easily due to their enhanced graphical representation.
- Start response optimization at a non-zero start time
- Save response optimization projects to the model workspace as well as MAT files and the MATLAB workspace
- View the number of simulations performed at each step of a response optimization

## **Known Software and Documentation Problems**

The MathWorks Web site includes a list of known software and documentation problems in Version 2.2.

If you are viewing these release notes in PDF form on the MathWorks Web site, please refer to the HTML form of the release notes on the MathWorks Web site and use the link provided.





# Simulink Response Optimization 2.1 Release Notes

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### **Major Bug Fixes**

Simulink Response Optimization 2.1 includes several bug fixes made since Version 2.0. You can see a list of the particularly important Version 2.1 bug fixes.

If you are viewing these Release Notes in PDF form, please refer to the HTML form of the Release Notes, using either the Help browser or the MathWorks Web site and use the link provided.

# Simulink Response Optimization 2.0 Release Notes

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## Introduction to Simulink Response Optimization

This section provides a brief overview of Simulink Response Optimization, which is being introduced in Release 14.

### About Simulink Response Optimization

Simulink Response Optimization provides a graphical user interface (GUI) to assist in design of control systems and physical systems. With this product, you can tune parameters within a nonlinear Simulink® model to meet time-domain performance requirements by graphically placing constraints within a time-domain window or tracking and closely matching a reference signal. You can tune any number of Simulink variables including scalars, vectors, and matrices by entering the variable name into the appropriate dialog box. In addition, you can place uncertainty bounds on other variables in the model for robust design. Simulink Response Optimization makes attaining performance objectives and optimizing tuned parameters an intuitive and easy process.

To use Simulink Response Optimization, you need only to include a special block, the Signal Constraint block, in your Simulink diagram. Just connect the block to any signal in the model to signify that you want to place some kind of constraint on the signal. Simulink Response Optimization automatically converts time-domain constraints into a constrained optimization problem and then solves the problem using optimization routines taken from the Optimization Toolbox and Genetic Algorithm and Direct Search Toolbox. The constrained optimization problem formulated by Simulink Response Optimization iteratively calls for simulations of the Simulink system, compares the results of the simulations with the constraint objectives, and uses gradient methods to adjust tuned parameters to better meet the objectives.

In previous releases, Simulink Response Optimization was called the Nonlinear Control Design Blockset (NCD). Simulink Response Optimization includes and improves upon the functionality of NCD. To upgrade your NCD models for use with Simulink Response Optimization, see “Upgrading from the Nonlinear Control Design Blockset” on page 3-4.

### Features

Key features of Simulink Response Optimization include the ability to

- Optimize signals or design criteria in any Simulink model by tuning selected model parameters
- Constrain signals to lie within time-domain signal bounds
- Closely track a reference, or desired, signal.
- Optimize responses for systems that include physical actuation limits and constraints on state/variable values.
- Optimize responses for noisy systems by including uncertainty in your parameter values.
- Compute the continuous and digital cumulative root mean square values of signals with the CRMS and DRMS blocks. Use these blocks with the Signal Constraint block to optimize the cumulative root mean square of signals in your models.

## **Major Enhancements**

Simulink Response Optimization features several major enhancements to the Nonlinear Control Design Blockset. These major enhancements include

- Support for discrete and hybrid models
- Support for stopping and restarting an optimization
- Ability to undo or redo optimization of parameter values
- Support for three different optimizers, offering more robust optimization algorithms
- Ability to constrain any signal in the model hierarchy
- Support for vector-valued signals

## Upgrading from the Nonlinear Control Design Blockset

In previous releases, Simulink Response Optimization was called the Nonlinear Control Design Blockset (NCD). Models that were created using NCD will not work with Simulink Response Optimization. To convert your NCD models for use with Simulink Response Optimization, use the `ncdupdate` function which is described in the Simulink Response Optimization Function Reference.