

Robust Control Toolbox™

Release Notes

How to Contact The MathWorks



www.mathworks.com Web
comp.soft-sys.matlab Newsgroup



support@mathworks.com Technical support
suggest@mathworks.com Product enhancement suggestions
bugs@mathworks.com Bug reports
doc@mathworks.com Documentation error reports
service@mathworks.com Order status, license renewals, passcodes
info@mathworks.com Sales, pricing, and general information



508-647-7000 Phone



508-647-7001 Fax



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

For contact information about worldwide offices, see the MathWorks Web site.

Robust Control Toolbox™ Release Notes

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Contents

Summary by Version	1
Version 3.4 (R2009b) Robust Control Toolbox™ Software	4
Version 3.3.3 (R2009a) Robust Control Toolbox™ Software	8
Version 3.3.2 (R2008b) Robust Control Toolbox™ Software	9
Version 3.3.1 (R2008a) Robust Control Toolbox™ Software	10
Version 3.3 (R2007b) Robust Control Toolbox™ Software	11
Version 3.2 (R2007a) Robust Control Toolbox™ Software	12
Version 3.1.1 (R2006b) Robust Control Toolbox™ Software	13
Version 3.1 (R2006a) Robust Control Toolbox™ Software	14
Version 3.0.2 (R14SP3) Robust Control Toolbox™ Software	15
Version 3.0.1 (R14SP2) Robust Control Toolbox™ Software	16
Compatibility Summary for Robust Control Toolbox™ Software	17

Summary by Version

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

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Latest Version V3.4 (R2009b)	Yes Details	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation
V3.3.3 (R2009a)	No	No	Bug Reports Includes fixes	No
V3.3.2(R2008b)	No	No	Bug Reports Includes fixes	No
V3.3.1 (R2008a)	Yes Details	No	No bug fixes	No
V3.3 (R2007b)	No	No	No bug fixes	No
V3.2 (R2007a)	Yes Details	No	No bug fixes	No
V3.1.1 (R2006b)	Yes Details	No	No bug fixes	No
V3.1 (R2006a)	No	No	No bug fixes	No
V3.0.2 (R14SP3)	No	No	No bug fixes	No
V3.0.1 (R14SP2)	Yes Details	No	No bug 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®) for enhancements, bugs, and compatibility considerations that also might impact you.

If you are upgrading from a software version other than the most recent one, review the 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 release notes for V1.1 and V1.2.

What's 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 is released appear under Bug Reports at the MathWorks Web site. Bug fixes can sometimes result in incompatibilities, so you should also 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. This includes 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.

About Functions and Properties Being Removed

This section lists functions or properties removed or in the process of being removed. Functions and properties typically go through several stages across multiple releases before being completely removed. This provides time for you to make adjustments to your code.

- **Announcement** — The Release Notes announce the planned removal, but there are no functional changes; the function runs as it did before.
- **Warning** — When you run the function, it displays a warning message indicating it will be removed in a future release; otherwise the function runs as it did before.
- **Error** — When you run the function, it produces an error. The error message indicates the function was removed and suggests a replacement function, if one is available.
- **Removal** — When you run the function, it fails. The error message is the standard message when MATLAB does not recognize an entry.

Functions and properties might be in a stage for one or more releases before moving to another stage. Functions and properties are listed in the Functions and Properties Being Removed section only when they enter a new stage and their behavior changes. For example, if a function displayed a warning in the previous release and errors in this release, it appears on the list. If it continues to display a warning, it does not appear on the list because there was no change between the releases.

Not all functions and properties go through all stages. For example, a function's impending removal might not be announced, but instead, the first notification might be that the function displays a warning.

The Release Notes include actions you can take to mitigate the effects of function or property removal, such as adapting your code to use a replacement function.

Version 3.4 (R2009b) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.4 (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	Printable Release Notes: PDF Current product documentation

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

- “New Option to Improve Robust Performance by Accounting for Real Uncertain Parameters”
- “New Command to Linearize Simulink Models with Uncertainty”
- “New Interface for Simulating Effects of Uncertainty in Simulink Models”
- “New Command to Model Multiple LTI Responses as One Uncertain System”
- “New and Updated Demos”
- “Functions, Properties and Blocks Being Removed”

New Option to Improve Robust Performance by Accounting for Real Uncertain Parameters

You can now improve robust performance by accounting for real uncertain parameters when designing controllers using μ -synthesis. The user-defined options you use in the `dksyn` command now includes a new option `MixedMU`. Set this option to 'on' to account for real uncertain parameters in your system. For more information, see the `dkitopt`, and `dksyn` reference pages.

New Command to Linearize Simulink Models with Uncertainty

If you have Simulink® Control Design™ software installed, you can take model uncertainty into account when linearizing a Simulink model. You can then use

the resulting uncertain linearized model (uss object) to perform linear analysis and robust control design.

If your model already contains Uncertain State Space blocks, use the new `ulinearize` command to obtain an `uss` model. If you want to account for uncertainty in your linear analysis without using Uncertain State Space blocks, you can specify individual Simulink blocks to linearize to an uncertain variable. For more information, see “Computing Uncertain State-Space Models from Simulink Models” in the *Robust Control Toolbox User’s Guide*.

New Interface for Simulating Effects of Uncertainty in Simulink Models

This version of the product provides a new interface to simulate the effects of uncertainty in Simulink® models. The interface includes the following:

- Uncertain State Space block to specify uncertain system in Simulink. You should replace USS System blocks in your existing models with the Uncertain State Space block. To do so, run the `slupdate` command on your models.
- `ufind` command to extract all uncertain variables from a Simulink model.
- `usample` command to generate random values of these uncertain variables.

For more information on simulating the effects of uncertainty using the new interface, see “Simulating Effects of Uncertainty” in the *Robust Control Toolbox User’s Guide*.

New Command to Model Multiple LTI Responses as One Uncertain System

This version of the product includes a new `ucover` command that lets you model a family of LTI responses as one uncertain system. For more information, see the `ucover` reference page.

New and Updated Demos

The following new and updated demos illustrate use of the new features:

- “Control of Spring-Mass-Damper Using Mixed μ -Synthesis” shows use of the new `MixedMU` option and `dksyn` command for mixed- μ synthesis.

- “Linearization of Simulink Models with Uncertainty” shows how to compute uncertain state-space models using `ulinearize` and Simulink Control Design software.
- “Robustness Analysis in Simulink” uses the new interface for simulating effects of uncertainty in Simulink models.
- “Simultaneous Stabilization Using Robust Control” and “Modeling a Family of Responses as an Uncertain System” show use of the `ucover` command.
- “First-Cut Robust Design” shows use of the `usample`, `ucover` and `dksyn` commands.

To access the demos, type

```
demo('toolbox','robust control')
```

Functions, Properties and Blocks Being Removed

For more information about the process of removing functions, see “About Functions and Properties Being Removed” in “What's in the Release Notes”.

Function, Property or Block Name	What Happens When You Use Function or Property?	Use This Instead	Compatibility Considerations
<code>usiminfo</code>	Still runs	<code>ufind</code>	See “New Interface for Simulating Effects of Uncertainty in Simulink Models”.
<code>usimfill</code>	Still runs	<code>ufind</code>	See “New Interface for Simulating Effects of Uncertainty in Simulink Models”.
<code>usimsamp</code>	Still runs	<code>usample</code>	See “New Interface for Simulating Effects of Uncertainty in Simulink Models”.

Function, Property or Block Name	What Happens When You Use Function or Property?	Use This Instead	Compatibility Considerations
USS System block	Still runs	Uncertain State Space block	See “New Interface for Simulating Effects of Uncertainty in Simulink Models”.
ltiarray2uss	Still runs	ucover	See “New Command to Model Multiple LTI Responses as One Uncertain System”.

Version 3.3.3 (R2009a) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.3.3 (R2009a):

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

Version 3.3.2 (R2008b) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.3.2 (R2008b):

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

Version 3.3.1 (R2008a) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.3.1 (R2008a):

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.

Ability to Use LOOPMARGIN with Simulink

This version of Robust Control Toolbox™ software lets you analyze the robustness of nonlinear Simulink® models using the LOOPMARGIN command.

If you have the Simulink® Control Design™ product installed, you can perform stability margin analysis of a Simulink model by passing the model name and a point within that model to the LOOPMARGIN command.

Version 3.3 (R2007b) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.3 (R2007b):

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

Version 3.2 (R2007a) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.2 (R2007a):

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.

New Simulink Blocks

- **USS System** — This Robust Control Toolbox™ version introduces a new Simulink® block, USS System. You can use this block to import uncertain systems into Simulink models.
- **Multiplot Graph** — Plot multiple signals in one figure.

Version 3.1.1 (R2006b) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.1.1 (R2006b):

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 Function `ltiarray2uss`

This Robust Control Toolbox™ version introduces a new function, `ltiarray2uss`. This function constructs an uncertain state-space model from an LTI array.

Version 3.1 (R2006a) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.1 (R2006a):

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

Version 3.0.2 (R14SP3) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.0.2 (R14SP3):

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

Version 3.0.1 (R14SP2) Robust Control Toolbox™ Software

This table summarizes what's new in Version 3.0.1 (R14SP2):

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:

mussvunwrap Is Renamed

mussvunwrap has been renamed. It is now called mussvextract.

New Functions `actual2normalized` and `normalized2actual`

This Robust Control Toolbox™ version introduced two new functions:

- `actual2normalized` — Calculate normalized distance between nominal value and given value for uncertain atom.
- `normalized2actual` — Convert value for atom in normalized coordinates to corresponding actual value.

Compatibility Summary for Robust Control Toolbox™ 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 with the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V3.4 (R2009b)	See “Functions, Properties and Blocks Being Removed”.
V3.3.3 (R2009a)	None
V3.3.2 (R2008b)	None
V3.3.1 (R2008a)	None
V3.3 (R2007b)	None
V3.2 (R2007a)	None
V3.1.1 (R2006b)	None
V3.1 (R2006a)	None
V3.0.2 (R14SP3)	None
V3.0.1 (R14SP2)	None

