

# **Curve Fitting Toolbox™**

## **Release Notes**

---

## How to Contact MathWorks



[www.mathworks.com](http://www.mathworks.com) Web  
[comp.soft-sys.matlab](mailto:comp.soft-sys.matlab) Newsgroup  
[www.mathworks.com/contact\\_TS.html](http://www.mathworks.com/contact_TS.html) Technical Support



[suggest@mathworks.com](mailto:suggest@mathworks.com) Product enhancement suggestions  
[bugs@mathworks.com](mailto:bugs@mathworks.com) Bug reports  
[doc@mathworks.com](mailto:doc@mathworks.com) Documentation error reports  
[service@mathworks.com](mailto:service@mathworks.com) Order status, license renewals, passcodes  
[info@mathworks.com](mailto:info@mathworks.com) Sales, pricing, and general information



508-647-7000 (Phone)



508-647-7001 (Fax)



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

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

*Curve Fitting Toolbox™ Release Notes*

© COPYRIGHT 2002–2011 by The MathWorks, Inc.

The software described in this document is furnished under a license agreement. The software may be used or copied only under the terms of the license agreement. No part of this manual may be photocopied or reproduced in any form without prior written consent from The MathWorks, Inc.

FEDERAL ACQUISITION: This provision applies to all acquisitions of the Program and Documentation by, for, or through the federal government of the United States. By accepting delivery of the Program or Documentation, the government hereby agrees that this software or documentation qualifies as commercial computer software or commercial computer software documentation as such terms are used or defined in FAR 12.212, DFARS Part 227.72, and DFARS 252.227-7014. Accordingly, the terms and conditions of this Agreement and only those rights specified in this Agreement, shall pertain to and govern the use, modification, reproduction, release, performance, display, and disclosure of the Program and Documentation by the federal government (or other entity acquiring for or through the federal government) and shall supersede any conflicting contractual terms or conditions. If this License fails to meet the government's needs or is inconsistent in any respect with federal procurement law, the government agrees to return the Program and Documentation, unused, to The MathWorks, Inc.

### Trademarks

MATLAB and Simulink are registered trademarks of The MathWorks, Inc. See [www.mathworks.com/trademarks](http://www.mathworks.com/trademarks) for a list of additional trademarks. Other product or brand names may be trademarks or registered trademarks of their respective holders.

### Patents

MathWorks products are protected by one or more U.S. patents. Please see [www.mathworks.com/patents](http://www.mathworks.com/patents) for more information.

<b>Summary by Version</b> .....	<b>1</b>
<b>Version 3.1 (R2011a) Curve Fitting Toolbox Software</b> ..	<b>4</b>
<b>Version 3.0 (R2010b) Curve Fitting Toolbox Software</b> ..	<b>5</b>
<b>Version 2.2 (R2010a) Curve Fitting Toolbox Software</b> ..	<b>7</b>
<b>Version 2.1 (R2009b) Curve Fitting Toolbox Software</b> ..	<b>9</b>
<b>Version 2.0 (R2009a) Curve Fitting Toolbox Software</b> ..	<b>10</b>
<b>Version 1.2.2 (R2008b) Curve Fitting Toolbox Software</b> .....	<b>11</b>
<b>Version 1.2.1 (R2008a) Curve Fitting Toolbox Software</b> .....	<b>12</b>
<b>Version 1.2 (R2007b) Curve Fitting Toolbox Software</b> ..	<b>13</b>
<b>Version 1.1.7 (R2007a) Curve Fitting Toolbox Software</b> .....	<b>14</b>
<b>Version 1.1.6 (R2006b) Curve Fitting Toolbox Software</b> .....	<b>15</b>
<b>Version 1.1.5 (R2006a) Curve Fitting Toolbox Software</b> .....	<b>16</b>
<b>Version 1.1.4 (R14SP3) Curve Fitting Toolbox Software</b> .....	<b>17</b>

<b>Version 1.1.3 (R14SP2) Curve Fitting Toolbox Software .....</b>	<b>18</b>
<b>Version 1.1.2 (R14SP1) Curve Fitting Toolbox Software .....</b>	<b>19</b>
<b>Version 1.1.1 (R14) Curve Fitting Toolbox Software ...</b>	<b>20</b>
<b>Version 1.1 (R13) Curve Fitting Toolbox Software ....</b>	<b>21</b>
<b>Compatibility Summary for Curve Fitting Toolbox Software .....</b>	<b>22</b>

## Summary by Version

This table provides quick access to what's new in each version. For clarification, see "Using Release Notes" on page 2.

<b>Version (Release)</b>	<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
<b>Latest Version V3.1 (R2011a)</b>	Yes Details	No	Bug Reports Includes fixes
V3.0 (R2010b)	Yes Details	No	Bug Reports Includes fixes
V2.2 (R2010a)	Yes Details	Yes Summary	Bug Reports Includes fixes
V2.1 (R2009b)	Yes Details	No	Bug Reports Includes fixes
V2.0 (R2009a)	Yes Details	No	Bug Reports Includes fixes
V1.2.2 (R2008b)	No	No	Bug Reports Includes fixes
V1.2.2 (R2008a)	No	No	Bug Reports Includes fixes
V1.2 (R2007b)	Yes Details	No	Bug Reports Includes fixes
V1.1.7 (R2007a)	No	No	Bug Reports Includes fixes
V1.1.6 (R2006b)	No	No	Bug Reports Includes fixes
V1.1.5 (R2006a)	No	No	No
V1.1.4 (R14SP3)	No	No	No
V1.1.3 (R14SP2)	Yes Details	No	No
V1.1.2 (R14SP1)	No	No	No

<b>Version (Release)</b>	<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
V1.1.1 (R14)	No	No	No
V1.1 (R13)	Yes Details	No	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**

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.

### **Documentation on the MathWorks Web Site**

Related documentation is available on [mathworks.com](http://mathworks.com) for the latest release and for previous releases:

- Latest product documentation
- Archived documentation

## Version 3.1 (R2011a) Curve Fitting Toolbox Software

This table summarizes what's new in Version 3.1 (R2011a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
Yes Details below	No	Bug Reports Includes fixes

### Fit with Anonymous Functions

The `fit` and `fitype` functions now accept anonymous functions. This enables you to use anonymous functions to define equations for curve fitting. Previously, `fitype` only accepted a text string or a cell array of text strings. Now you can also use anonymous functions, making it easier to pass other data into the function.

For more information, see the `fit` and `fitype` reference pages.



## Version 3.0 (R2010b) Curve Fitting Toolbox Software

This table summarizes what's new in Version 3.0 (R2010b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

- “New Spline Fitting” on page 5
- “New Data Selections in Surface Fitting Tool” on page 5

### New Spline Fitting

Curve Fitting Toolbox™ now contains all of the spline functions that were previously available in Spline Toolbox™.

Splines are smooth piecewise polynomials. You can use the spline functions to create and manipulate spline approximation models of data. You can create splines in piecewise polynomial form (ppform) and B-form.

The spline functions are a collection of algorithms for data fitting, interpolation, extrapolation, and visualization. The new spline features include a graphical user interface for creating, visualizing, and manipulating splines. Additional functions enable you to evaluate, plot, combine, differentiate, and integrate splines, manipulate breaks/knots, and optimally place knots.

For more information see “Spline Fitting” in the Curve Fitting Toolbox User’s Guide.

### New Data Selections in Surface Fitting Tool

In Surface Fitting Tool, you can select matrices of the same size, or you can also now fit surfaces to data stored as a table. “Table data” means that X and Y represent the row and column headers of a table and the values in the table are the values of the Z output. Sizes are compatible if X and Y are vectors of

length  $n$  and  $m$ , and  $Z$  is a matrix of size  $[m, n]$ . For more details see “Table Data” in the Interactive Surface Fitting documentation.

Surface Fitting Tool can now read integer and floating-point data. You can now select any numeric data in your workspace. Previously the tool would only accept vectors of type `double`.

For more information see “Selecting Data” in the Interactive Surface Fitting documentation.

## Version 2.2 (R2010a) Curve Fitting Toolbox Software

This table summarizes what's new in Version 2.2 (R2010a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	Yes—Details labeled as <b>Compatibility Considerations</b> , below. See also Summary.	Bug Reports Includes fixes

- “New Toolbar in Surface Fitting Tool” on page 7
- “Usability Improvements for Surface Fitting Workflow” on page 7
- “Improved Gaussian Library Model” on page 8
- “Functions and Function Elements Being Removed” on page 8

### New Toolbar in Surface Fitting Tool

A new toolbar in Surface Fitting Tool makes it easier to discover and control plotting options. You can use the toolbar to:

- Toggle plot mode between Rotate 3D, Data Cursor, and Exclude Outliers
- Control which plots are displayed of Surface, Residuals and Contour plots
- Control the Legend, Grid and Axis Limits

See “Exploring and Customizing Plots” in the Surface Fitting Tool documentation.

### Usability Improvements for Surface Fitting Workflow

In Surface Fitting Tool, plot mode now defaults to Rotate 3D. A common surface fitting workflow is to manipulate and view the surface plot from various angles. You no longer have to select plot rotate mode initially, because it is now on by default. You can use the toolbar to switch to data cursor or

exclude outliers mode. When you turn off data cursor or exclude outliers mode, your cursor mode is automatically set back to Rotate.

See “Using Rotation, Data Cursor, and Outlier Exclusion” in the Surface Fitting Tool documentation.

The initial surface fit for polynomials is now a linear plane in  $\mathbf{x}$  and  $\mathbf{y}$  (poly11). Previously the default fit was a quadratic polynomial in  $\mathbf{x}$  and  $\mathbf{y}$  (poly22).

If you are going to use a polynomial to fit a model, it can be helpful to start by looking at a reference plane.

See “Selecting Fit Settings” in the Surface Fitting Tool documentation.

## Improved Gaussian Library Model

The gaussian library model has been updated to use improved starting value defaults. You may see different answers to previous releases because of the improved starting values.

See “Library Models” in the Interactive Curve Fitting documentation.

## Functions and Function Elements Being Removed

Function Element Name	What Happens When You Use This Function Element	Use This Instead	Compatibility Considerations
'Algorithm', 'Gauss-Newton' property name/value pair as input to fitoptions method	Warns when you call the fit method	'Algorithm', 'Levenberg-Marquardt' property name/value pair as input to fitoptions method	Use 'Levenberg-Marquardt' as the value for Algorithm instead.

## Version 2.1 (R2009b) Curve Fitting Toolbox Software

This table summarizes what's new in Version 2.1 (R2009b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

New features introduced in this version:

- New function to compute the first and second derivatives of a fitted surface. See `differentiate` in the User's Guide.
- New function to compute the volume under a fitted surface. See `quad2d` in the User's Guide.
- New surface fitting examples:
  - "Franke Data Interactive Surface Fitting Example"
  - "Biopharmaceutical Interactive Surface Fitting Example"
  - "Automotive Fuel Efficiency Programmatic Surface Fitting Example"
  - "Biopharmaceutical Drug Interaction Programmatic Surface Fitting Example"

## Version 2.0 (R2009a) Curve Fitting Toolbox Software

This table summarizes what's new in Version 2.0 (R2009a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

New features introduced in this version:

### Interactive Surface Fitting

You can interactively fit surfaces to data and view plots with the new flexible and intuitive Surface Fitting Tool GUI.

- Create, plot, and compare multiple surface fits
- Use linear or nonlinear regression, interpolation, local smoothing regression, or custom equations
- View goodness-of-fit statistics, display confidence intervals and residuals, remove outliers and assess fits with validation data
- Automatically generate M-code for fitting and plotting surfaces, or export fits to workspace for further analysis

For more information, see “Interactive Surface Fitting”.

### Programmatic Surface Fitting

New surface fit objects store the results from a fitting operation, making it easy to plot and analyze fits at the command line.

For more information, see “Surface Fitting Objects and Methods”.

## Version 1.2.2 (R2008b) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.2.2 (R2008b):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	Bug Reports Includes fixes

There were no new features or changes in this version.

## Version 1.2.1 (R2008a) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.2.1 (R2008a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	Bug Reports Includes fixes

There were no new features or changes in this version.



## Version 1.2 (R2007b) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.2 (R2007b):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
Yes Details below	No	Bug Reports Includes fixes

New feature introduced in this version:

### **Edit Custom Equations in Curve Fitting Tool**

When using Curve Fitting Tool, you can now edit your custom equations without copying them. Buttons to **Edit** and **Copy and Edit** appear with the list of custom equations in the Fitting GUI.

## Version 1.1.7 (R2007a) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.1.7 (R2007a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	Bug Reports Includes fixes

There were no new features or changes in this version.

## Version 1.1.6 (R2006b) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.1.6 (R2006b):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	Bug Reports Includes fixes

There were no new features or changes in this version.

## Version 1.1.5 (R2006a) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.1.5 (R2006a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	No

There were no new features or changes in this version.

## Version 1.1.4 (R14SP3) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.1.4 (R14SP3):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	No

There were no new features or changes in this version.

## Version 1.1.3 (R14SP2) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.1.3 (R14SP2):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
Yes Details below	No	No

New feature introduced in this version:

### **Prompt to Save Session**

The `cftool` graphical user interface now prompts you to save your session when you quit only if you have changed something (created data sets, created fits, etc.) since your last save. Prior to this release `cftool` would unconditionally prompt you to save every time you quit.

## Version 1.1.2 (R14SP1) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.1.2 (R14SP1):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	No

There were no new features or changes in this version.

## Version 1.1.1 (R14) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.1.1 (R14):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	No

There were no new features or changes in this version.



## Version 1.1 (R13) Curve Fitting Toolbox Software

This table summarizes what's new in Version 1.1 (R13):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	No

New features and changes introduced in this version are organized by these topics:

- “Exclude GUI” on page 21
- “Viewing Data Numerically” on page 21

### Exclude GUI

The Exclude pane of the Data GUI has been removed. To exclude and section data, a separate Exclude GUI is now available. You can open this GUI by selecting the **Exclude** button on the Curve Fitting Tool.

### Viewing Data Numerically

The View pane of the Data GUI has been removed. To view data numerically, you can use:

- The Data Sets pane of the Data GUI to view imported data
- The Smooth pane of the Data GUI to view a smoothed data set
- The Exclude GUI to view existing exclusion rules.

## Compatibility Summary for Curve Fitting 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.

<b>Version (Release)</b>	<b>New Features and Changes with Version Compatibility Impact</b>
<b>Latest Version V3.1 (R2011a)</b>	None
V3.0 (R2010b)	None
V2.2 (R2010a)	See “Functions and Function Elements Being Removed” on page 8.
V2.1 (R2009b)	None
V2.0 (R2009a)	None
V1.2.2 (R2008b)	None
V1.2.1 (R2008a)	None
V1.2 (R2007b)	None
V1.1.7 (R2007a)	None
V1.1.6 (R2006b)	None
V1.1.5 (R2006a)	None
V1.1.4 (R14SP3)	None
V1.1.3 (R14SP2)	None
V1.1.2 (R14SP1)	None
V1.1.1 (R14)	None
V1.1 (R13)	None