

# **GARCH Toolbox Release Notes**

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|--|----------|
| <b>Summary by Version</b> .....                      | <b>1</b> |
| About Release Notes .....                            | <b>1</b> |
| <br>   |          |
| <b>Version 2.3 (R2006b) GARCH Toolbox</b> .....      | <b>4</b> |
| Data Preprocessing .....                             | <b>4</b> |
| Demos .....  | <b>4</b> |
| <br>   |          |
| <b>Version 2.2 (R2006a) GARCH Toolbox</b> .....      | <b>5</b> |
| User's Guide .....                                   | <b>5</b> |
| Statistical Functions .....                          | <b>5</b> |
| <br>   |          |
| <b>Version 2.1 (R14SP3) GARCH Toolbox</b> .....      | <b>7</b> |
| Changes to garchsim .....                            | <b>7</b> |
| <br>   |          |
| <b>Compatibility Summary for GARCH Toolbox</b> ..... | <b>9</b> |



## 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 V2.3 (R2006b)</b> | Yes<br>Details                  | No  | No                                   | Printable Release Notes: PDF<br><br>Current product documentation |
| V2.2 (R2006a)                       | Yes<br>Details                  | No  | No                                   | No  |
| V2.1 (R14SP3)                       | Yes<br>Details                  | Yes<br>Summary                              | No                                   | 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 with the previous version, 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 GARCH Toolbox” on page 9.

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 2.3 (R2006b) GARCH Toolbox

This table summarizes new features in V2.3 (R2006b).

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems | Related Documentation at Web Site                             |
|--------------------------|--------------------------------------|-------------------------------|---|
| Yes<br>Details below     | No                                   | No                            | Printable Release Notes: PDF<br>Current product documentation |

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

- “Data Preprocessing” on page 4
- “Demos” on page 4

### Data Preprocessing

A new Hodrick-Prescott filter, `hpfilter`, separates time series into trend and cyclical components

### Demos

A new demo uses the `hpfilter` function to reproduce the results in Hodrick and Prescott’s original paper on U.S. business cycles



## Version 2.2 (R2006a) GARCH Toolbox

This table summarizes new features in V2.2 (R2006a).

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems | Related Documentation at Web Site |
|--------------------------|--------------------------------------|-------------------------------|-----------------------------------|
| Yes<br>Details below     | No                                   | No                            | No                                |

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

- “User’s Guide” on page 5
- “Statistical Functions” on page 5

### User’s Guide

A new chapter in the *GARCH Toolbox User’s Guide* explains how to conduct Dickey-Fuller and Phillips-Perron unit root tests with the new statistical functions in the toolbox.

### Statistical Functions

Version 2.2 of the GARCH Toolbox has six new functions. All of them support the ability to conduct univariate unit root tests on time-series data. Three functions support augmented Dickey-Fuller unit root tests. The remaining three support Phillips-Perron unit root tests.

### Dickey-Fuller Unit Root Tests

| Function  | Purpose  |
|-----------|--|
| dfARDTest | Augmented Dickey-Fuller unit root test based on AR model with drift. |

| <b>Function</b> | <b>Purpose</b>   |
|-----------------|--|
| dfARTest        | Augmented Dickey-Fuller unit root test based on zero drift AR model.       |
| dfTSTest        | Augmented Dickey-Fuller unit root test based on trend stationary AR model. |

### **Phillips-Perron Unit Root Tests**

| <b>Function</b> | <b>Purpose</b>  |
|-----------------|---|
| ppARDTest       | Phillips-Perron unit root test based on AR(1) model with drift.       |
| ppARTest        | Phillips-Perron unit root test based on zero drift AR(1) model.       |
| ppTSTest        | Phillips-Perron unit root test based on trend stationary AR(1) model. |

## Version 2.1 (R14SP3) GARCH Toolbox

This table summarizes what's new in V2.1 (R14SP3):

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems | Related Documentation at Web Site |
|--------------------------|--------------------------------------|-------------------------------|-----------------------------------|
| Yes<br>Details below     | Yes<br>Summary                       | No bug fixes                  | No                                |

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

- “Changes to garchsim” on page 7

### Changes to garchsim

A change introduced in V2.1 of the GARCH Toolbox concerns user-specified noise processes. The `garchsim` function now allows you to provide a time-series matrix of standardized, i.i.d. disturbances to drive the output innovations in a time-series process. In previous versions, you could only provide a state that was used to generate a random noise process. See the `State` input argument on the `garchsim` reference page for more information.

### Compatibility Considerations

**garchsim argument `Is` renamed.** In V2.1, the `garchsim` argument `Seed` is renamed to `State` for consistency with the MATLAB® `rand` and `randn` functions. The name change, in itself, introduces no backward incompatibilities. The following topic explains a related change.

**garchsim defaults to current random number generator state.** In V2.0.1 of the GARCH Toolbox, if you did not specify the `Seed` argument, `garchsim` used the initial random number generator state, 0. The `Seed` argument corresponded to the `rand` and `randn` state value.

In V2.1, if you do not specify the `State` (formerly `Seed`) argument, `garchsim` uses the current state of `rand` and `randn`, rather than the initial state. You can use the commands `s = rand('state')` and `s = randn('state')` to

determine the current state of these random number generators. See the `rand` and `randn` reference pages for more information.

## Compatibility Summary for GARCH Toolbox

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.

| <b>Version (Release)</b>                | <b>New Features and Changes with Version Compatibility Impact</b>  |
|---|--|
| <b>Latest Version<br/>V2.3 (R2006b)</b> | None   |
| V2.2 (R2006a)                           | None   |
| V2.1 (R14SP3)                           | See the <b>Compatibility Considerations</b> subheading for each of these new features and changes: <ul style="list-style-type: none"><li>• “Changes to garchsim” on page 7</li></ul> |