

Statistics Toolbox Release Notes

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Summary by Version

This table provides quick access to what's new in each version. For clarification, see "About 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 V5.2 (R2006a)	Yes Details	No	Bug Reports at Web site	Printable Release Notes: PDF V5.2 product documentation
V5.1 (R14SP3)	Yes Details	No	No	No
V5.0.2 (R14SP2)	Yes Details	No	Bug Reports at Web site	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 between versions, 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 Statistics Toolbox” on page 13.

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 5.2 R2006a Statistics Toolbox

This table summarizes what's new in V5.2 R2006a:

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	Printable Release Notes: PDF V5.2 product documentation

New features and changes introduced in this version are:

- “Parametric Methods for Copulas” on page 4
- “Random Number Generators ” on page 5
- “Multivariate Cumulative Distribution” on page 5
- “Bootstrap Confidence Interval” on page 5
- “Jackknife Estimation” on page 6
- “Durbin-Watson test” on page 6
- “Fractional Factorial Designs Generator” on page 6
- “Enhanced Functionality” on page 6
- “New and Updated Demos” on page 7

Parametric Methods for Copulas

The Statistics Toolbox 5.2 contains the following new functions for analyzing copulas:

- `copulacdf` — Compute the cumulative probability function for a copula.
- `copulaparam` — Compute the copula parameters as a function of rank correlation.
- `copulapdf` — Compute the probability density function for a copula.

- `copularnd` — Generate random vectors from a copula.
- `copulastat` — Compute the rank correlation for a copula.

Random Number Generators

New functions for generating random numbers include:

Monte Carlo Markov Chain Algorithms

The following functions have been added to the Statistics Toolbox Version 5.2 that generate random numbers when the distribution is a nonstandard form.

- `mhsample` — Generate random numbers from a distribution using the Metropolis-Hasting algorithm.
- `slicesample` — Generate random numbers from a distribution using the slice sampling algorithm.

Pearson and Johnson Systems of Distributions

Two functions that generate random numbers without requiring you to resample the original data or fit a parametric distribution have been added to the Statistics Toolbox Version 5.2:

- `pearsrnd` — Generate random numbers from the Pearson system of distributions.
- `johnsrnd` — Generate random numbers from the Johnson system of distributions.

Multivariate Cumulative Distribution

Two new functions have been added to compute the multivariate cdf, `mvncdf` for the normal distribution, and `mvtcdf` for the t distribution.

Bootstrap Confidence Interval

The new `bootci` function computes the 95% BCa bootstrap confidence interval for a given input function.

Jackknife Estimation

The new `jackknife` estimation function that draws jackknife data samples and computes statistics on each sample.

Durbin-Watson test

The new `dwtest` function performs a Durbin-Watson test for autocorrelation in linear regression.

Fractional Factorial Designs Generator

The new `fracfactgen` function generates a set of fractional factorial design generators for fitting a specified model.

Enhanced Functionality

- **Nested and continuous factors support** functionality added for the `anovan` function.
- **Time series data support** functionality added for the functions:
 - `xbarplot`
 - `schart`
 - `ewmplot`
- **Robust fitting support** functionality added for the functions:
 - `nlinfit`
 - `nlparci`
 - `nlpredci`
 - `robustfit`
- **D-optimal design enhancements** added for the functions:
 - `daugment`
 - `dcovary`
 - `candexch`
 - `candgen`

- cordexch
- rowexch
- x2fx

New and Updated Demos

The Statistics Toolbox contains the following new demos for Version 5.2:

- Bayesian Analysis for a Logistic Regression Model
- Time Series Regression of Airline Passenger Data

The following demo has been updated for Version 5.2:

- Random Number Generation

Version 5.1 R14SP3 Statistics Toolbox

This table summarizes what's new in V5.1 R14SP3:

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

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

- “Partial Correlation” on page 8
- “Two New Univariate Probability Distributions” on page 8
- “New Hypothesis Tests” on page 10
- “New and Enhanced Functionality for Inverse Prediction and Prediction Intervals” on page 10
- “Survival Analysis” on page 11
- “Enhanced Plotting Usability of ksdensity and ecdf” on page 11
- “New and Updated Demos” on page 11

Partial Correlation

The new `partialcorr` function computes the correlation of one set of variables while controlling for a second set of variables.

Two New Univariate Probability Distributions

The Statistics Toolbox Version 5.1 provides support for two new distributions: the generalized extreme value distribution and the generalized Pareto distribution.

Generalized Extreme Value (GEV) Distribution

The GEV distribution combines the Gumbel, Frechet, and Weibull distributions into a single distribution , and can be used to model extremes in data.

The Statistics Toolbox 5.1 contains the following new functions for analyzing GEV distributions:

- `gevcdf` – Compute the cdf of a GEV distribution.
- `gevfit` – Compute parameter estimates and confidence intervals for GEV data.
- `gevinv` – Compute the inverse cdf of a GEV distribution.
- `gevlike` – Compute the negative log-likelihood for the GEV distribution.
- `gevpdf` – Compute the pdf of a GEV distribution.
- `gevrnd` – Generate random numbers from a GEV distribution.
- `gevstat` – Compute the mean and variance of a GEV distribution.

Generalized Pareto (GP) Distribution

The GP distribution can be used to model the tails of data.

The Statistics Toolbox 5.1 contains the following new functions for analyzing GP distributions:

- `gpcdf` – Compute the cdf of a GP distribution.
- `gpfit` – Compute parameter estimates and confidence intervals for GP data.
- `gpinv` – Compute the inverse cdf of a GP distribution.
- `gplike` – Compute the negative log-likelihood for the GP distribution.
- `gppdf` – Compute the pdf of a GP distribution.
- `gprnd` – Generate random numbers from a GP distribution.
- `gpstat` – Compute the mean and variance of a GP distribution.

New Hypothesis Tests

Chi-Square Goodness-of-Fit Test

The new `chi2gof` function tests for the goodness of fit of observed data to a specified distribution.

Variance Tests

Three functions have been added to test variances in one sample, two samples, or multiple samples. The new functions are `vartest`, `vartest2`, and `vartestn`, respectively.

Ansari-Bradley Test

The new `ansaribradley` function tests the hypothesis that two independent samples come from the same distribution, against the hypothesis that they come from distributions with the same median and shape but different variances.

Tests of Randomness

The new `runstest` function tests the hypothesis that the input values are in a random order.

New and Enhanced Functionality for Inverse Prediction and Prediction Intervals

- The new `invpred` function estimates the inverse prediction for simple linear regression.
- The `polyconf` function can compute either simultaneous or nonsimultaneous intervals for a new observation or for the polynomial itself. You can now enter optional arguments as parameter name/value pairs.
- The `grpstats` function can now compute a wider variety of descriptive statistics for grouped data. Choices include the mean, standard error of the mean, number of elements, group name, standard deviation, variance, confidence interval for the mean, and confidence interval for the new

observation. You can also apply any other descriptive statistics function, or one you write yourself, to the grouped data.

Survival Analysis

The new `coxphfit` function fits the input data to Cox's proportional hazards regression, a distribution-free method for predicting survival as a function of other variables.

Enhanced Plotting Usability of `ksdensity` and `ecdf`

Both the `ksdensity` and the `ecdf` functions will now plot the results when no output arguments are specified.

New and Updated Demos

The Statistics Toolbox contains the following new demos for Version 5.1:

- Fitting a Univariate Distribution Using Cumulative Probabilities
- Curve Fitting and Distribution Fitting
- Pitfalls in Fitting Nonlinear Models by Transforming to Linearity
- Fitting an Orthogonal Regression Using Principal Components Analysis
- Weighted Nonlinear Regression
- Modelling Tail Data with the Generalized Pareto Distribution

The following demo has been updated for Version 5.1:

- Modelling Data with the Generalized Extreme Value Distribution

Version 5.0.2 R14SP2 Statistics Toolbox

This table summarizes what's new in V5.0.2 R14SP2:

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

New features and changes introduced in this version are:

- “Cophenetic Correlation” on page 12

Cophenetic Correlation

The `cophenet` function computes the cophenetic correlation coefficient for a hierarchical cluster tree. This is the correlation between the cophenetic distances obtained from the tree and the original distances (or dissimilarities) used to construct the tree. Thus it is a measure of how faithfully the tree represents the dissimilarities among observations. Now in Version 5.0.2, the function also returns a second output that is the vector of cophenetic distances.

Compatibility Summary for Statistics 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. Details are provided in the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V5.2 R2006a	None
V5.1 (R14SP3)	None
V5.0.2 (R14SP2)	None