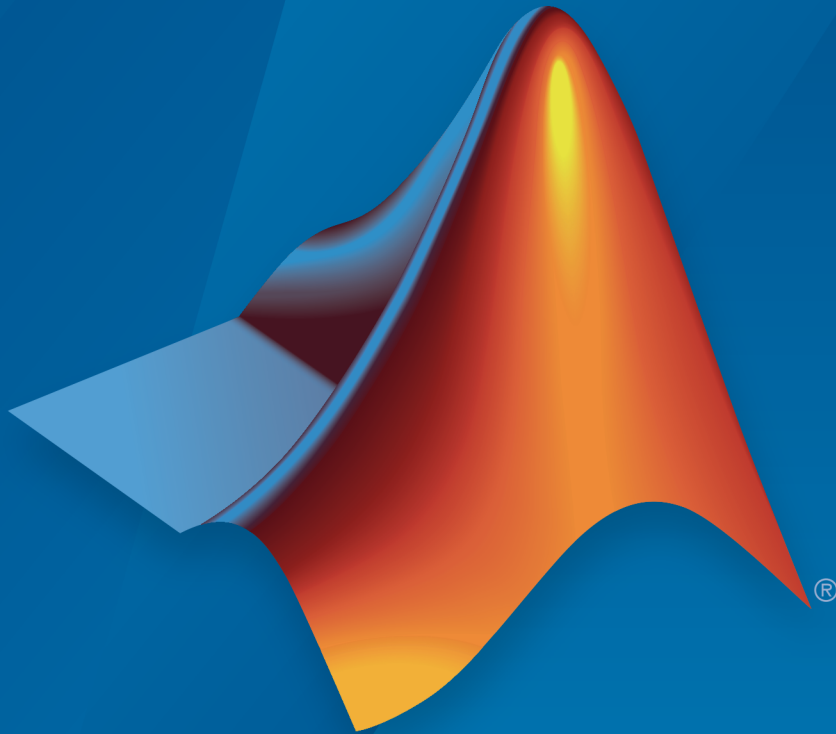


Financial Toolbox™ Release Notes



MATLAB®

How to Contact MathWorks



Latest news: www.mathworks.com
Sales and services: www.mathworks.com/sales_and_services
User community: www.mathworks.com/matlabcentral
Technical support: www.mathworks.com/support/contact_us



Phone: 508-647-7000



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

Financial Toolbox™ Release Notes

© COPYRIGHT 2005–2015 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 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 for more information.

R2015a

Credit scorecard enhancements for model validation, a binning algorithm, and probability of default computation	1-2
autobinning support for 'Monotone' has compatibility impact	1-2
Life table calibration and simulation for insurance	1-3
SDE suite parallel computing example	1-3
frontcon removal	1-3
portopt partial removal	1-4

R2014b

Credit scorecard functionality	2-2
Performance improvements to CVaR portfolio optimization when using the <code>fmincon</code> function	2-2
Performance improvements to SDE Monte Carlo simulation for models with constant parameter or deterministic function of time	2-2
Fan chart visualization function	2-3

SDE functions accept parameters that can be specified as a single input argument	2-3
Default option for the <code>cuttingplane</code> solver for <code>PortfolioCVaR</code> optimization changed	2-3

R2014a

SDE functions moved to Financial Toolbox from Econometrics Toolbox	3-2
Performance enhancements to SDE Monte Carlo simulation functions	3-3

R2013b

Mean-absolute deviation (MAD) portfolio optimization	4-2
<code>optioptions</code> support	4-2
Functions moved from Financial Instruments Toolbox to Financial Toolbox	4-2

R2013a

Cash flow plot function	5-2
Financial Time Series Tool (<code>ftstool</code>) import of Excel XLSX files on Linux and Mac OS X	5-2
Cutting-plane solver added to <code>PortfolioCVaR</code> object	5-2

transprobbytotals errors when using the algorithm input argument	5-2
Using datenum, datestr, datevec with dates in Financial products might produce inconsistent results	5-2

R2012b

Conditional value at risk (CVaR) portfolio optimization . . .	6-2
Margin and spread calculations for floating-rate bonds	6-2
Total (horizon) return calculation for fixed-coupon bonds .	6-2
Performance improvements for cfamounts	6-2

R2012a

XIRR Update	7-2
Additional Support for Cash Flow Functions	7-2
New Demo for Portfolio Optimization Tools	7-2

R2011b

One-Way Turnover Constraints Added to the Portfolio Object	8-2
Portfolio Optimization with Sharpe Ratio Maximization Using a Portfolio Object	8-2

Cash Flow and Time Mapping for Bond Portfolios with Variable Coupon Rates and Variable Face Values	8-2
Transition Probability Functions for Credit Quality Thresholds, Nonsquare Matrices, and User-Defined Ratings	8-2
New Demo for Forecasting Corporate Default Rates	8-2
Functionality Being Removed	8-3
Warning and Error ID Changes	8-3
transprobbytotals Warns When Using the algorithm Input Argument	8-4

R2011a

Portfolio Turnover and Transaction Costs	9-2
Updated showdemo Command for Credit Rating Demo	9-2

R2010b

Estimation of Transition Probabilities for Credit Risk	10-2
Improved Performance in Portfolio Optimization Functions	10-2
New Demo for Credit Rating	10-2
New Input and Output Options for Swap Functionality	10-2

R2010a

No New Features or Changes

R2009b

Support for the BUS/252 Day-Count Convention	12-2
Extended Support for New York Stock Exchange Closures	12-2
Enhancements for Bond Pricing	12-2

R2009a

Support for Key Rate Duration	13-2
------------------------------------------------	-------------

R2008b

No New Features or Changes

R2008a

Enhanced Mean-Variance Portfolio Optimization Based on Linear Complementarity Programming for Portfolio Optimization	15-2
Support for Actual/365 (ISDA)	15-2
Support for ret2tick and tick2ret Functions for Time Series Objects	15-3
Support for Additional Descriptive Statistics Functions Financial Times Series Objects	15-3
Added New Chart Types	15-4

R2007b

ISMA Support for 30/360 Basis as a Variant of 30/360E with Annual Compounding	16-2
createholidays Function Added for Different Trading Calendars	16-3
Diagonal Covariance Matrix Support Added for Multivariate Normal Regression	16-3
arith2geom and geom2arith Functions Added for Portfolio Analysis	16-4

R2007a

ISMA Support Added	17-2
---------------------------------	------

R2006b

Investment Performance Metrics	18-2
Financial Time Series Tool	18-2

R2006a

Financial Time Series Toolbox Incorporated	19-2
Financial Time Series Frequency Conversion Functions Modified	19-2
Continuous Compounding Option Removed from plyd2zero	19-2
New Statistical Functions	19-2
Multivariate Normal Regression Without Missing Data	19-2
Multivariate Normal Regression With Missing Data (Expectation Conditional Maximization)	19-3
Least Squares Regression With Missing Data (Expectation Conditional Maximization)	19-3
Financial Model Transformation Function	19-3

R14SP3

New Statistical Functions	20-2
Expectation Conditional Maximization	20-2

R2015a

Version: 5.5

New Features

Bug Fixes

Compatibility Considerations

Credit scorecard enhancements for model validation, a binning algorithm, and probability of default computation

- Enhancements to `autobinning` for the `Algorithm` name-value pair argument, where a new option `'Monotone'` is supported. `Monotone` is an optimal binning algorithm that ensures monotonicity in the weight of evidence (WOE) of the resulting bins.
- Credit scorecards support model validation using `validateModel` that provides the following three techniques:
 - Receiver Operating Characteristic (ROC)
 - Cumulative Accuracy Profile (CAP)
 - Kolmogorov-Smirnov (KS)
- Credit scorecards support probability of default using `probdefault`.

autobinning support for `'Monotone'` has compatibility impact

The `autobinning` function for credit scorecards has an incompatibility with the previous release. The latest version of `autobinning` supports, by default, new binning behavior where the default for the `'Algorithm'` argument is now a new name-value pair argument for `'Monotone'`. In addition, the algorithms `'EqualFrequency'` and `'EqualWidth'` now support `'SortCategories'` option for categorical data. By default, categorical data is sorted by `'odds'` before binning.

Compatibility Considerations

To recover the previous behavior, use `autobinning` with the following name-value pairs:

- For the syntax `sc = autobinning(sc)` in R2014b, starting in R2015a, the syntax is equivalent to using:

```
sc = autobinning(sc, 'Algorithm', 'EqualFrequency', 'AlgorithmOptions', {'SortCategories', 'M'})
```

- For the syntax `sc = autobinning(sc, 'Algorithm', 'EqualWidth')` in R2014b, starting in R2015a, the syntax is equivalent to using:

```
sc = autobinning(sc, 'Algorithm', 'EqualWidth', 'AlgorithmOptions', {'SortCategories', 'M'})
```

- For the syntax `sc = autobinning(sc, 'Algorithm', 'EqualFrequency')` in R2014b, starting in R2015a, the syntax is equivalent to using:

```
sc = autobinning(sc, 'Algorithm', 'EqualFrequency', 'AlgorithmOptions', {'SortCategories
```

Life table calibration and simulation for insurance

Life tables compute the probabilities, hazards, and survivor counts associated with people who are alive at a specified age and have the likelihood of death within a given period in the future. Four main parametric mortality models are supported for life studies: Gompertz, Gompertz-Makeham, Siler, and Heligman-Pollard.

- `lifetableconv` — Convert life table data from either raw form or generated form into different formats and series.
- `lifetablefit` — Calibrate parametric life table models based on life table data.
- `lifetablegen` — Generate life table data from parametric models.

SDE suite parallel computing example

New example showing how to use Parallel Computing Toolbox™ with SDE functions to improve performance. For details, see “Improving Performance of Monte Carlo Simulation with Parallel Computing”.

frontcon removal

`frontcon` will be removed in a future release. Use `Portfolio` instead.

Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
<code>frontcon</code>	Warns	<code>Portfolio</code>	Replace all instances of <code>frontcon</code> with <code>Portfolio</code> .

To turn off the `frontcon` warning, see “Turning off the Warning Messages for `frontcon`”.

For more information on migrating `frontcon` code to `Portfolio`, see “`frontcon` Migration to `Portfolio` Object”.

portopt partial removal

portopt will be partially removed in a future release and will no longer accept `ConSet` or `varargin` arguments. In a future release, portopt will solve the portfolio problem for long-only fully invested portfolios. Use `Portfolio` instead.

Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
portopt	Warns	Portfolio	If you want to solve a portfolio problem that is more than a long-only fully invested portfolio, replace all instances of portopt with Portfolio.

To turn off the portopt warning, see “Turning off the Warning Messages for portopt”.

For more information on migrating portopt code to Portfolio, see “portopt Migration to Portfolio Object”.

R2014b

Version: 5.4

New Features

Bug Fixes

Credit scorecard functionality

Modeling support for credit scorecard development that includes the following new functions:

- `creditscorecard` creates the `creditscorecard` object.
- `autobinning` applies automatic binning for single or multiple predictors.
- `bininfo` returns bin information for a given predictor.
- `modifybins` lets you modify bins for a given predictor.
- `bindata` bins a dataset using the existing binning rules and performs Weight of Evidence (WOE) transformation.
- `plotbins` plots histogram counts for predictor variables.
- `fitmodel` fits a logistic regression model using Weight of Evidence (WOE) data.
- `setmodel` sets the predictors and coefficients of a linear logistic regression model fitted outside the `creditscorecard` object and returns an updated `creditscorecard` object.
- `displaypoints` returns scorecard points information, such as points per bin or points per predictor.
- `formatpoints` lets you modify point information, such as scaling or rounding.
- `score` determines the score for each row of a dataset.

For more information, see [Using creditscorecard Objects](#), [Credit Scorecard Modeling Workflow](#), and [Case Study for a Credit Scorecard Analysis](#).

Performance improvements to CVaR portfolio optimization when using the `fmincon` function

Support for `fmincon` gradients when using `setSolver` for CVaR portfolio optimization provides increased performance for CVaR optimizations.

Performance improvements to SDE Monte Carlo simulation for models with constant parameter or deterministic function of time

Certain SDE models that use a constant parameter or a deterministic function of time have a performance improvement.

Fan chart visualization function

Support for financial fan charts using `fanplot`. Use `fanplot` to plot the combination of historical and forecast data to visualize possible outcomes.

SDE functions accept parameters that can be specified as a single input argument

The following SDE functions accept parameters you can specify as a single input argument that is identified as a deterministic function of time if the function accepts a scalar time `t` as its only input argument.

- `bm`
- `cev`
- `cir`
- `diffusion`
- `drift`
- `gbm`
- `heston`
- `hwv`
- `sdeld`
- `sdemrd`

In addition, `ts2func` accepts a new parameter value argument for `Deterministic` to support deterministic functions of time.

Default option for the `cuttingplane` solver for `PortfolioCVaR` optimization changed

The default option for the `cuttingplane` solver for a `PortfolioCVaR` object has changed. The `cuttingplane` default option for `MasterSolverOptions` has changed from

```
optimoptions('linprog','Algorithm','Simplex','Display','off')
```

to

```
optimoptions('linprog','Algorithm','Dual-Simplex','Display','off')
```

For more information, see Dual-simplex algorithm in linprog linear programming solver in the Release Notes for Optimization Toolbox™.

R2014a

Version: 5.3

New Features

Bug Fixes

SDE functions moved to Financial Toolbox from Econometrics Toolbox

The following Stochastic Differential Equation (SDE) functions have moved from Econometrics Toolbox™ to Financial Toolbox™:

- `bm`
- `cev`
- `cir`
- `diffusion`
- `drift`
- `gbm`
- `heston`
- `hwv`
- `interpolate`
- `sde`
- `sdeddo`
- `sdemrd`
- `simByEuler`
- `simBySolution`
- `simulate`
- `ts2func`

The following sample data sets and examples from the `matlab/toolbox/econ/econdemos` directory have moved to `matlab/toolbox/finance/findemos`:

- `Demo_AmericanBasket`
- `Example_BarrierOption`
- `Example_BlackScholes`
- `Example_CEVModel`
- `Example_CIRModel`
- `Example_CopulaRNG`
- `Example_LongstaffSchwartz`
- `Example_StratifiedRNG`

-
- `Data_GlobalIdx2.mat`

Performance enhancements to SDE Monte Carlo simulation functions

Monte Carlo simulation performance enhancements to the approximate solution function (`simBySolution`) of GBM and HWV models with constant parameters.

R2013b

Version: 5.2

New Features

Compatibility Considerations

Mean-absolute deviation (MAD) portfolio optimization

New portfolio object PortfolioMAD for mean-absolute deviation (MAD) portfolio optimization.

optimoptions support

optimoptions support when using solver options for Portfolio, PortfolioCVaR, and PortfolioMAD objects for portfolio optimization.

Compatibility Considerations

There are two possible incompatibility impacts:

- When using Portfolio or PortfolioCVaR objects and the associated Portfolio.setSolver or PortfolioCVaR.setSolver methods, the default solver options now reference an optimoptions object, instead of an optimset structure. If you now use default solver options and operating on them assuming this is an optimset structure, some of those operations may no longer work.
- The Portfolio or PortfolioCVaR objects and the associated Portfolio.setSolver or PortfolioCVaR.setSolver methods let you pass name-value pair arguments of solver options. In the past, setting solver options that were unused by the solver of choice would simply have no effect, because optimset would accept the options, and the solver would simply ignore them. In contrast, optimoptions objects generate an error if you attempt to set an invalid option.

optimoptions is the default and recommended method to set solver options, however, optimset is also supported.

Functions moved from Financial Instruments Toolbox to Financial Toolbox

The following functions are moved from Financial Instruments Toolbox™ to Financial Toolbox:

- cdai
- cdprice
- cdyield
- tbilldisc2yield

-
- `tbillprice`
 - `tbillrepo`
 - `tbillval01`
 - `tbillyield`
 - `tbillyield2disc`

R2013a

Version: 5.1

New Features

Compatibility Considerations

Cash flow plot function

Graphical representation for cash flows using `cfplot`.

Financial Time Series Tool (`ftstool`) import of Excel XLSX files on Linux and Mac OS X

Support for `ftstool` import of Excel[®] XLSX files on Linux[®] and Mac OS X.

Cutting-plane solver added to PortfolioCVaR object

New solver option (`'cuttingplane'`) for PortfolioCVaR object for conditional value-at-risk (CVaR) portfolio optimization. For more information, see `setSolver`.

`transprobytotals` errors when using the `algorithm` input argument

The `'totals'` input argument to `transprobytotals` is typically generated by `transprob`. Because `transprob` includes an `'algorithm'` field in this structure since R2011b, you no longer need to specify the `'algorithm'` argument using a name-value pair when calling `transprobytotals`. If you specify an `'algorithm'` argument as a name-value pair when calling `transprobytotals`, you now receive an error.

Compatibility Considerations

Specifying the `'algorithm'` as a name-value pair argument to `transprobytotals` now causes an error. If you started using this functionality in R2011b or later, most likely you don't have to take any action. If you have used this functionality before R2011b, make sure you remove the `'algorithm'` name-value pair from calls to `transprobytotals`, and that the `'totals'` input argument to `transprobytotals` contains an `'algorithm'` field indicating the desired algorithm. In most cases, the latter can be achieved by recreating the `'totals'` structure with a call to `transprob` which automatically adds the `'algorithm'` field since R2011b.

Using `datenum`, `datestr`, `datevec` with dates in Financial products might produce inconsistent results

Any time you enter a cell array of date strings that are in different date formats using the MATLAB[®] functions `datenum`, `datestr`, and `datevec`, these functions previously

returned an error. In R2013a, this behavior has changed. In Financial products this change can cause an unexpected date format to generate an incorrect value. For example, the following use of `datevec` returned an error before R2013a because of the inconsistent date formats, but in R2013a this code does not return an error.

```
datevec({'10-Oct-2012', '10-1-2012'}),
```

Compatibility Considerations

As a best practice, you should convert date strings to date numbers before using any functions in Financial Toolbox that use dates as inputs. For more information, see [No strict-match requirements for month formats when converting date strings in the MATLAB release notes](#).

R2012b

Version: 5.0

New Features

Conditional value at risk (CVaR) portfolio optimization

New portfolio object PortfolioCVaR for conditional value at risk (CVaR) portfolio optimization.

Margin and spread calculations for floating-rate bonds

Support for calculating spread measures for floating-rate bonds using floatdiscmargin and floatmargin.

Total (horizon) return calculation for fixed-coupon bonds

Support for calculating bond horizon return using bndtotalreturn.

Performance improvements for cfamounts

Performance improvement for calculating cash flows using cfamounts.

R2012a

Version: 4.2

New Features

XIRR Update

Support is added to `xirr` for a global search heuristic to enhance the robustness of `xirr`.

Additional Support for Cash Flow Functions

Function	Purpose
<code>cfsread</code>	Calculate the spread over a zero curve for a given cash flow.
<code>cfprice</code>	Calculate the price for a given cash flow given yield to maturity.
<code>cfyield</code>	Calculate the yield to maturity for a given cash flow and price.

New Demo for Portfolio Optimization Tools

A new demo shows how to set up mean-variance optimization problems using the `portfolio` object. Run the demo at the MATLAB command line by entering:

```
showdemo portfolioexamples
```

R2011b

Version: 4.1

New Features

Compatibility Considerations

One-Way Turnover Constraints Added to the Portfolio Object

The portfolio object supports one-way turnover constraints using the new methods `setOneWayTurnover` and `getOneWayTurnover`.

Portfolio Optimization with Sharpe Ratio Maximization Using a Portfolio Object

The portfolio object supports estimating an efficient portfolio that maximizes the Sharpe ratio using the new method `estimateMaxSharpeRatio`.

Cash Flow and Time Mapping for Bond Portfolios with Variable Coupon Rates and Variable Face Values

Updated `cfamounts` now supports time-varying `CouponRate` and `Face` scheduling, including support for sinking fund bonds.

Transition Probability Functions for Credit Quality Thresholds, Nonsquare Matrices, and User-Defined Ratings

Support is added for credit quality thresholds with `transprobtothresholds` and `transprobfromthresholds`. Support is added for data preprocessing for `transprob` using `transprobprep`. Support is added for user-defined ratings and nonsquare transition matrices with `transprobrouptotals` and `transprobbytotals`. For more information, see [Credit Risk Analysis](#).

New Demo for Forecasting Corporate Default Rates

A new demo shows how to forecast corporate default rates. This includes backtesting and stress testing examples. Run the demo at the MATLAB command line by entering:

```
showdemo Demo_DefaultRatesForecasts
```

Functionality Being Removed

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
proddf	Warns	bndprice	Replace all instances of <code>proddf</code> with <code>bndprice</code> .
proddf1	Warns	bndprice	Replace all instances of <code>proddf1</code> with <code>bndprice</code> .
proddl	Warns	bndprice	Replace all instances of <code>proddl</code> with <code>bndprice</code> .
yldodd1	Warns	bndyield	Replace all instances of <code>yldodd1</code> with <code>bndyield</code> .
yldoddf	Warns	bndyield	Replace all instances of <code>yldoddf</code> with <code>bndyield</code> .
yldoddf1	Warns	bndyield	Replace all instances of <code>yldoddf1</code> with <code>bndyield</code> .
prbond	Warns	bndprice	Replace all instances of <code>prbond</code> with <code>bndprice</code> .
yldbond	Warns	bndyield	Replace all instances of <code>yldbond</code> with <code>bndyield</code> .
checksiz	Warns	N/A	Remove all instances from your code.
checktyp	Warns	N/A	Remove all instances from your code.
checkrng	Warns	N/A	Remove all instances from your code.

Warning and Error ID Changes

Many warning and error IDs have changed from their previous versions. These warnings or errors typically appear during a function call.

Compatibility Considerations

If you use warning or error IDs, you might need to change the strings you use. For example, if you turned off a warning for a certain ID, the warning might now appear under a different ID. If you use a `try/catch` statement in your code, replace the old identifier with the new identifier. There is no definitive list of the differences, or of the IDs that changed.

transprobytotals Warns When Using the `algorithm` Input Argument

The `totals` input to `transprobytotals` is typically generated by `transprob`. Because `transprob` now includes an `algorithm` field in this structure, you no longer need to specify the `algorithm` argument when calling `transprobytotals`.

Compatibility Considerations

In a future release, specifying the `algorithm` argument to `transprobytotals` will error. Currently, it is still permissible to specify the `algorithm` argument, although it usually has no effect.

R2011a

Version: 4.0

New Features

Portfolio Turnover and Transaction Costs

New portfolio object and methods support mean-variance portfolio optimization with general linear constraints, transaction costs, and turnover constraints. For more information, see Portfolio Optimization Tools and Portfolio Optimization Objects.

Updated showdemo Command for Credit Rating Demo

The command to run the demo showing how to use Statistics Toolbox™ functions to support credit ratings is updated. Run the demo at the MATLAB command line by entering:

```
showdemo creditratingdemo
```


R2010b

Version: 3.8

New Features

Estimation of Transition Probabilities for Credit Risk

Support for estimation of transition matrices based on credit-migration history using both cohort and duration methods. For more information, see `transprob`, `transprobbytots`, and `Estimation of Transition Probabilities`.

Improved Performance in Portfolio Optimization Functions

`portopt` is enhanced for improved speed. Specifically, a broader class of problems now uses the faster linear complementarity programming (LCP) algorithm to obtain portfolios on the efficient frontier.

New Demo for Credit Rating

A new demo shows how to use Statistics Toolbox functions to support credit ratings. Run the demo at the MATLAB command line by entering:

```
echodemo demo_creditrating
```

New Input and Output Options for Swap Functionality

`cfamounts` is enhanced to support new parameter/value pairs for swap functionality.

R2010a

Version: 3.7.1

No New Features or Changes

R2009b

Version: 3.7

New Features

Support for the BUS/252 Day-Count Convention

Support for the `Basis` day-count convention for BUS/252. BUS/252 is the number of business days between the previous coupon payment and the settlement data divided by 252. BUS/252 business days are non-weekend, non-holiday days. The `holidays.m` file defines holidays.

Extended Support for New York Stock Exchange Closures

The current `holidays` function covers holidays and non-trading days from 1950 to 2050. Using `nyseclosures`, you can determine all known and anticipated closures from January 1, 1885 to December 31, 2050.

Enhancements for Bond Pricing

Support for the following enhancements to bond pricing functions:

- Provide the ability to specify the compounding frequency separately from the coupon frequency.
- Enable specification of a discounting basis. A discounting basis has two purposes in Price/YTM calculations:
 - Computing the accrued interest
 - Computing the discount factors
- Support the specification of a formula for computing the interest in the last coupon period.

The enhanced bond pricing functions are:

Function	Purpose
<code>accfrac</code>	Calculate fraction of coupon period before settlement.
<code>bndprice</code>	Price fixed-income security from yield to maturity.
<code>bndyield</code>	Calculate yield to maturity for fixed-income security.
<code>bndspread</code>	Calculate static spread over spot curve.
<code>bnddurp</code>	Calculate bond duration given price.
<code>bnddury</code>	Calculate bond duration given yield to maturity.

Function	Purpose
bndconvp	Calculate bond convexity given price.
bndconvy	Calculate bond convexity given yield.
cfamounts	Calculate cash flow and time mapping for a bond portfolio.
cftimes	Calculate time factors corresponding to bond cash flow dates.

R2009a

Version: 3.6

New Features

Support for Key Rate Duration

Added support for `bndkrdur` to calculate key rate duration for bonds to determine the sensitivities of a bond to nonparallel changes in the yield curve. For more information, see [Calculating Key Rate Durations for Bonds](#).

R2008b

Version: 3.5

No New Features or Changes

R2008a

Version: 3.4

New Features

Enhanced Mean-Variance Portfolio Optimization Based on Linear Complementarity Programming for Portfolio Optimization

Added support for `varargin` argument for `portopt` and `frontcon`.

Support for Actual/365 (ISDA)

The following functions now support day count conventions for the `basis` argument based on ISDA (International Swap Dealers Association) `actual/365`:

- `accfrac`
- `acrubond`
- `acrudisc`
- `bndconvp`
- `bndconvy`
- `bnddurp`
- `bnddury`
- `bndprice`
- `bndspread`
- `bndyield`
- `cfamounts`
- `cfdates`
- `cftimes`
- `cpncount`
- `cpndaten`
- `cpndatenq`
- `cpndatep`
- `cpndatepq`
- `cpndaysn`
- `cpnpersz`
- `datemnth`
- `daysadd`

-
- `daysdif`
 - `disc2zero`
 - `discrate`
 - `fvdisc`
 - `fwd2zero`
 - `prbyzero`
 - `prdisc`
 - `prmat`
 - `pyld2zero`
 - `time2date`
 - `yeardays`
 - `yearfrac`
 - `ylddisc`
 - `yldmat`
 - `zbtprice`
 - `zbtyield`
 - `zero2disc`
 - `zero2fwd`
 - `zero2pyld`

Support for `ret2tick` and `tick2ret` Functions for Time Series Objects

`ret2tick` and `tick2ret` support financial time series objects.

Support for Additional Descriptive Statistics Functions Financial Times Series Objects

The following covariance methods now support a financial time series object:

- `corrcoef`
- `cov`
- `isempty`

- nancov
- nanmax
- nanmedian
- nanmin
- nanstd
- nansum
- nanvar
- var

Added New Chart Types

Added support for the following chart types for financial reporting:

- kagi
- renko
- linebreak
- priceandvol
- volarea

R2007b

Version: 3.3

New Features

ISMA Support for 30/360 Basis as a Variant of 30/360E with Annual Compounding

The following functions now support day count conventions for the `basis` argument to support 30/360 International Securities Market Association (ISMA) convention as a variant of 30/360E with annual compounding:

- `accfrac`
- `acubond`
- `acrudisc`
- `bndconvp`
- `bndconvy`
- `bnddurp`
- `bnddury`
- `bndprice`
- `bndspread`
- `bndyield`
- `cfamounts`
- `cfdates`
- `cftimes`
- `cpncount`
- `cpndaten`
- `cpndatenq`
- `cpndatep`
- `cpndatepq`
- `cpndaysn`
- `cpnpersz`
- `datemnth`
- `daysadd`
- `daysdif`
- `disc2zero`
- `discrate`

-
- `fvdisc`
 - `fwd2zero`
 - `prbyzero`
 - `prdisc`
 - `prmat`
 - `pyld2zero`
 - `time2date`
 - `yeardays`
 - `yearfrac`
 - `ylddisc`
 - `yldmat`
 - `zbtprice`
 - `zbtyield`
 - `zero2disc`
 - `zero2fwd`
 - `zero2pyld`

createholidays Function Added for Different Trading Calendars

The `createholidays` function now supports <http://www.FinancialCalendar.com> trading calendars. This function can be used from the command line or from the Trading Calendars graphical user interface. Using `createholidays`, you can create `holiday.m` files, in conjunction with `FinancialCalendar.com` data, that can be used instead of the standard `holidays.m` that ships with Financial Toolbox software.

Diagonal Covariance Matrix Support Added for Multivariate Normal Regression

The new diagonal covariance matrix estimation feature makes it possible to estimate large-scale factor models by treating the residual errors as being jointly independent. The following functions support `CovarFormat`, a new input argument:

- `ecmlsrml`
- `ecmmvnrml`

- `ecmmvnrfish`
- `ecmmvnrobj`
- `ecmmvnrstd`
- `mvnrfish`
- `mvnrml`
- `mvnrobj`
- `mvnrstd`

arith2geom and geom2arith Functions Added for Portfolio Analysis

Two new functions, `arith2geom` and `geom2arith`, support portfolio analysis.

R2007a

Version: 3.2

New Features

Bug Fixes

ISMA Support Added

The following functions now support the International Securities Market Association (ISMA) convention for the `basis` argument:

- `accfrac`
- `acrubond`
- `acrudisc`
- `bndconvp`
- `bndconvy`
- `bnddurp`
- `bnddury`
- `bndprice`
- `bndspread`
- `bndyield`
- `cfamounts`
- `cfdates`
- `cftimes`
- `cpncount`
- `cpndaten`
- `cpndatenq`
- `cpndatep`
- `cpndatepq`
- `cpndaysn`
- `cpnpersz`
- `datemnth`
- `daysadd`
- `daysdif`
- `disc2zero`
- `discrate`
- `fvdisc`
- `fwd2zero`

-
- prbyzero
 - prdisc
 - prmat
 - pyld2zero
 - time2date
 - yeardays
 - yearfrac
 - ylddisc
 - yldmat
 - zbtprice
 - zbtyield
 - zero2disc
 - zero2fwd
 - zero2pyld

R2006b

Version: 3.1

New Features

Investment Performance Metrics

The following new functions are added to compute common investment performance and risk-adjusted metrics:

- `sharpe`, computes the sharpe ratio.
- `inforatio`, computes information ratio and tracking error.
- `portalpha`, computes risk-adjusted alpha and return.
- `lpm`, computes sample lower partial moments.
- `elpm`, computes expected lower partial moments.
- `maxdrawdown`, computes the drop from maximum to minimum return over a period of time.
- `emaxdrawdown`, computes the returns that are transformed into a linear Brownian motion with drift.

Financial Time Series Tool

Financial Time Series Tool (`ftstool`) is a new graphical user interface to support working with financial time series `FINTS` objects. `ftstool` interoperates with the Financial Time Series Graphical User Interface (`ftsgui`) and Interactive Charts (`chartfts`).

R2006a

Version: 3.0

New Features

Financial Time Series Toolbox Incorporated

As of this release the functionality previously available in Financial Time Series Toolbox has been incorporated into Financial Toolbox software. Financial Toolbox documentation has been modified to include the documentation previously available in the Financial Time Series User's Guide.

Because use of Financial Time Series Toolbox required the purchase and installation of Financial Toolbox software, all customers previously licensed for Financial Time Series Toolbox will continue to have access to it.

Financial Time Series Frequency Conversion Functions Modified

The suite of time series frequency conversion functions (todayly, toweekly, tomonthly, tosemi, and toannual) has been extensively modified. Consult the function references in the Financial Toolbox User's Guide for specifics.

Continuous Compounding Option Removed from pyld2zero

Continuous compounding is no longer available for pyld2zero. Compounding for this function is now consistent with compounding for the function zero2pyld. An error message is generated if you attempt to use continuous compounding with these functions.

New Statistical Functions

The new functions in Version 3.0 of Financial Toolbox software fall into these four categories:

- “Multivariate Normal Regression Without Missing Data” on page 19-2
- “Multivariate Normal Regression With Missing Data (Expectation Conditional Maximization)” on page 19-3
- “Least Squares Regression With Missing Data (Expectation Conditional Maximization)” on page 19-3
- “Financial Model Transformation Function” on page 19-3

Multivariate Normal Regression Without Missing Data

mvnrfish	Fisher information matrix for multivariate normal or least-squares regression
----------	-------------------------------------------------------------------------------

mvnrml	Multivariate normal regression (ignore missing data)
mvnrobj	Log-likelihood function for multivariate normal regression without missing data
mvnrstd	Evaluate standard errors for multivariate normal regression model

Multivariate Normal Regression With Missing Data (Expectation Conditional Maximization)

ecmmvnrfish	Fisher information matrix for multivariate normal regression model
ecmmvnrml	Multivariate normal regression with missing data
ecmmvnrobj	Log-likelihood function for multivariate normal regression with missing data
ecmmvrstd	Evaluate standard errors for multivariate normal regression model

Least Squares Regression With Missing Data (Expectation Conditional Maximization)

ecmlsrml	Least-squares regression with missing data
ecmlsrobj	Log-likelihood function for least-squares regression with missing data

Financial Model Transformation Function

convert2sur	Convert a multivariate normal regression model into a seemingly unrelated regression model
-------------	--------------------------------------------------------------------------------------------

R14SP3

Version: 2.5

New Features

New Statistical Functions

Version 2.5 introduces a set of financial statistical computation routines that compute values, such as mean and covariance, when there are missing data elements within a larger data set. These routines implement the Expectation Conditional Maximization (ECM) algorithm with various options that depend on the percentage of missing at random (MAR) data within the data set. The table below lists the functions that implement the ECM algorithm in Financial Toolbox software.

The following ECM functions have been added at this release.

Expectation Conditional Maximization

ecmnfish	Fisher information matrix
ecmnhess	Hessian of negative log-likelihood function
ecmninit	Initial mean and covariance
ecmnmle	Mean and covariance of incomplete multivariate normal data
ecmnobj	Negative log-likelihood function
ecmnstd	Standard errors for mean and covariance of incomplete data