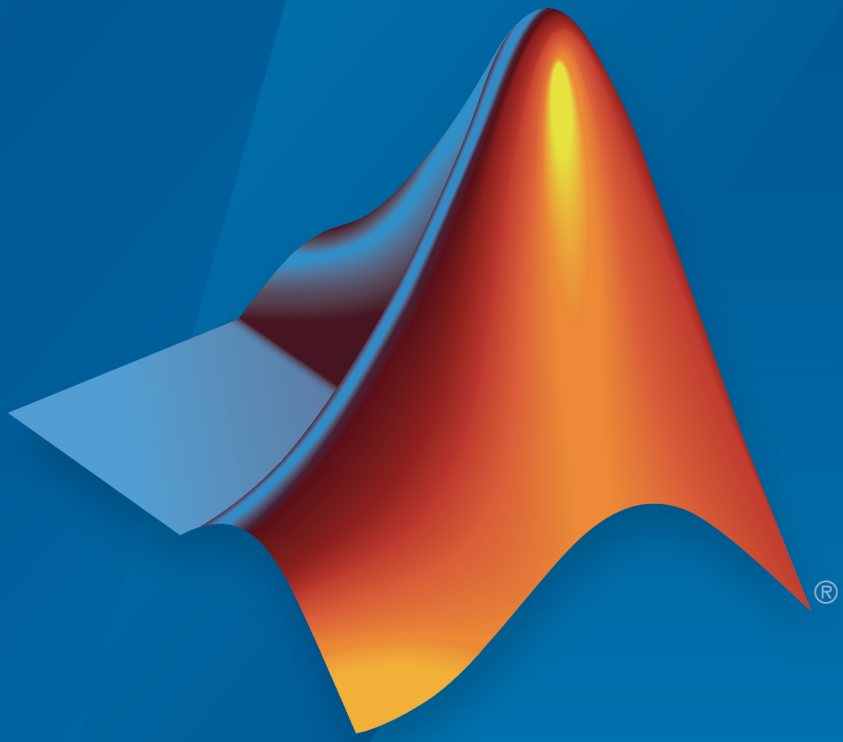
Financial Toolbox™ Release Notes



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Financial Toolbox™ Release Notes

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R2016b

Credit Scorecards: Last binning operation in creditscorecard

Credit scorecard supports information on the last binning operation when using `predictorinfo`. The `T` output argument for `predictorinfo` displays information on `'LastestBinning'`.

Functions moved to Financial Toolbox from Financial Instruments Toolbox

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

- `cdsbootstrap` calculates barrier option prices using finite difference method.
- `cdsprice` calculates barrier option prices and sensitivities using finite difference method.
- `cdsspread` calculates price for a European barrier options using Black-Scholes option pricing model.
- `cdsrpv01` calculates price and sensitivities for a European barrier options using Black-Scholes option pricing model.
- `creditexposures` computes credit exposures from contract values.
- `exposureprofiles` computes exposure profiles from credit exposures.

help findemos removal

The `help findemos` command is removed in this release. Use the `demo` command instead.

Compatibility Considerations

Command Name	What Happens When You Use This Command	Use This Command Instead	Compatibility Considerations
`help findemos`	Errors	`demo 'toolbox' 'financial'`	Replace all instances of `help findemos` with `demo 'toolbox' 'financial'`.

R2016a

Plots: Fan chart enhancements

fanplot accepts name value pair arguments to control chart colors and line sizes for the historical and forecast lines.

Date and Time: `datetime` support for calendar functions

Support for `datetime` for the following calendar functions according to these guidelines:

- Functions that take date inputs and output dates. If any of the date inputs are `datetime` arrays, then the date outputs are returned as a `datetime`. Otherwise, the dates are returned as `datenums`.
- Functions that take date inputs, but do not output dates. In this case, the function should return the same output whether the date inputs are `datenums` or `datetime`.
- Functions that do not take in date inputs, but output dates. In this case, an extra optional input argument `outputType` is included that allows you to specify the output as a `'datenum'` or a `'datetime'`. The default behavior is `'datenum'`.

- accrfrac
- acrubond
- acrudisc
- beytbill
- bndconvp
- bndconvy
- bnddurp
- bnddury
- bndkrdur
- bndprice
- bndspread
- bndtotalreturn
- bndyield
- busdate
- busdays
- candle

- cdai
- cdprice
- cdyield
- cfamounts
- cfdates
- cfdatesq
- cfplot
- cfport
- cfprice
- cfspread
- cfyield
- cftimes
- cpncount
- cpndaten
- cpndatenq
- cpndatepq
- cpndatep
- cpndaysn
- cpndaysp
- cpnpersz
- dateaxis
- date2time
- datefind
- datemnth
- datewrkdy
- days252bus
- days360
- days360e
- days360isda
- days360psa
- days365

- daysact
- daysadd
- daysdif
- disc2zero
- discrate
- eomdate
- fanplot
- fbusdate
- floatdiscmargin
- floatmargin
- fvdisc
- fvvar
- fwd2zero
- highlow
- holidays
- isbusday
- kagi
- lbusdate
- linebreak
- lweekdate
- m2xdate
- nweekdate
- nyseclosures
- periodicreturns
- prbyzero
- prdisc
- priceandvol
- prmat
- prtbill
- pvvar
- pyld2zero

- renko
- ret2tick
- tbilldisc2yield
- tbillprice
- tbillrepo
- tbillval01
- tbillyield
- tbillyield2disc
- tbl2bond
- thirdwednesday
- tick2ret
- time2date
- tmfactor
- today
- totalreturnprice
- tr2bonds
- uicalendar
- volarea
- weeknum
- wrkdydif
- x2mdate
- xirr
- yearfrac
- ylddisc
- yldmat
- yldtbill
- zbtprice
- zbtyield
- zero2disc
- zero2fwd
- zero2pyld

Date and Time: function to return the quarter of a given date

Support for quarter. The purpose of this function is to return the quarter of a given date.

Functionality Removed

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
`proddf`	Removed	bndprice	Replace all instances of `proddf` with bndprice.
`proddfl`	Removed	bndprice	Replace all instances of `proddfl` with bndprice.
`proddl`	Removed	bndprice	Replace all instances of `proddl` with bndprice.
`yldoddl`	Removed	bndyield	Replace all instances of `yldoddl` with bndyield.
`yldoddf`	Removed	bndyield	Replace all instances of `yldoddf` with bndyield.
`yldoddfl`	Removed	bndyield	Replace all instances of `yldoddfl` with bndyield.
`prbond`	Removed	bndprice	Replace all instances of `prbond` with bndprice.
`yldbond`	Removed	bndyield	Replace all instances of `yldbond` with bndyield.
`checksiz`	Removed	N/A	Remove all instances from your code.
`checktyp`	Removed	N/A	Remove all instances from your code.
`checkrng`	Removed	N/A	Remove all instances from your code.

ugarch removal

ugarch is removed in this release. Use the garch object from the Econometrics Toolbox™ instead.

Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
ugarch	Errors	estimate	Replace all instances of ugarch with the garch object to create conditional variance models and use the estimate function to fit conditional variance models to data.

For more information on migrating ugarch code to garch, see Likelihood Ratio Test for Conditional Variance Models.

ugarchllf removal

ugarchllf is removed in this release. Use the garch object from the Econometrics Toolbox instead.

Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
ugarchllf	Errors	garch	Replace all instances of ugarchllf with garch.

For more information on migrating ugarchllf code to garch, see Specify GARCH Models Using garch.

ugarchpred removal

ugarchpred is removed in this release. Use the garch object from the Econometrics Toolbox instead.

Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
ugarchpred	Errors	forecast	Replace all instances of ugarchpred with the garch object to create conditional variance models and use the forecast function to generate minimum mean square error forecasts.

For more information on migrating ugarchpred code to garch, see Forecast a Conditional Variance Model.

ugarchsim removal

ugarchsim is removed in this release. Use the garch object from the Econometrics Toolbox instead.

Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
ugarchsim	Errors	simulate	Replace all instances of ugarchsim with the garch object to create conditional variance models and use the simulate function to generate Monte Carlo simulations from conditional variance models.

For more information on migrating ugarchsim code to garch, see Simulate Conditional Variance Model.

frontcon removal

`frontcon` has been removed. Use Portfolio instead.

Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
`frontcon`	Errors	Portfolio	Replace all instances of `frontcon` with Portfolio.

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

portopt partial removal

portopt has been partially removed and no longer accepts `ConSet` or `varargin` input arguments. In this release, a modified portopt only solves a 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	Error if `ConSet` or `varargin` input arguments are used.	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.

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

R2015b

Portfolio Optimization: Calculate mean-variance portfolios with tracking error constraint

Support for two new functions to set up tracking error constraints for a Portfolio object.

- setTrackingPort sets up tracking or benchmark portfolio for a tracking error constraint.
- setTrackingError sets up a maximum portfolio tracking error constraint.

Credit Scorecards: Set predictor types to numeric or categorical and view summary information

Credit scorecard supports two new functions for reviewing and converting predictor types:

- predictorinfo provides a summary of credit scorecard predictors and their properties.
- modifypredictor enables you to set properties for credit scorecard predictors to change a predictor type from numeric to categorical or vice versa.

In addition, the `creditscorecard` object has two new properties, `NumericPredictors` and `CategoricalPredictors` which have public `GetAccess` and private `SetAccess`, that is, they cannot be set at the command line using the dot notation.

Transition Probability Estimates: Enter data using table input

Support for MATLAB® table input for transprob and transprobprep.

Simple Interest Convention: Calculate zero, forward, and discount curves using simple interest

Support for simple interest for the following functions:

- zero2disc — Support added for `Compounding = 0` for simple interest where there is no compounding.
- disc2zero — Support added for `Compounding = 0` for simple interest where there is no compounding.

- zero2fwd — Support added for `InputCompounding = 0` for simple interest where there is no compounding, and also `OutputCompounding = 0` for simple interest. See "Functionality Being Changed for `fwd2zero`, `zero2fwd`, `pyld2zero`, and `zero2pyld`" on page 3-3.
- fwd2zero — Support added for `InputCompounding = 0` for simple interest where there is no compounding, and also `OutputCompounding = 0` for simple interest. See "Functionality Being Changed for `fwd2zero`, `zero2fwd`, `pyld2zero`, and `zero2pyld`" on page 3-3.
- date2time — Support added for `Compounding = 0` for simple interest where there is no compounding.
- zero2pyld — Support added for `InputCompounding = 0` for simple interest where there is no compounding. See "Functionality Being Changed for `fwd2zero`, `zero2fwd`, `pyld2zero`, and `zero2pyld`" on page 3-3.
- pyld2zero — Support added for `OutputCompounding = 0` for simple interest where there is no compounding. See "Functionality Being Changed for `fwd2zero`, `zero2fwd`, `pyld2zero`, and `zero2pyld`" on page 3-3.
- zbtprice — Support added for `OutputCompounding = 0` for simple interest where there is no compounding.
- zbtyield — Support added for `OutputCompounding = 0` for simple interest where there is no compounding.

Functionality Being Changed for `fwd2zero`, `zero2fwd`, `pyld2zero`, and `zero2pyld`

These functions now accept additional optional input arguments that are specified as name-value pairs: `InputCompounding`, `OutputCompounding`, `InputBasis`, and `OutputBasis`.

In addition, for pyld2zero and zero2pyld, the settings for the default behavior for optional name-value pairs inputs have changed. For more information, see the reference pages for pyld2zero and zero2pyld.

ugarch removal

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Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
ugarch	Warns	estimate	Replace all instances of ugarch with the garch object to create conditional variance models and use the estimate function to fit conditional variance models to data.

For more information on migrating ugarch code to garch, see Likelihood Ratio Test for Conditional Variance Models.

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Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
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For more information on migrating ugarchllf code to garch, see Specify GARCH Models Using garch.

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Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
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For more information on migrating ugarchpred code to garch, see Forecast a Conditional Variance Model.

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ugarchsim will be removed in a future release. Use the garch object from the Econometrics Toolbox instead.

Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
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For more information on migrating ugarchsim code to garch, see Simulate Conditional Variance Model.

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Compatibility Considerations

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
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For more information on migrating `frontcon` code to Portfolio, see frontcon Migration to Portfolio Object.

portopt partial removal

portopt has been partially removed and no longer accepts `ConSet` or `varargin` input arguments. In this release, a modified portopt only solves a 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	Error if `ConSet` or `varargin` input arguments are used	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.

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

R2015a

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
  ```

- 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','N
  ```

- 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
frontcon	Warns	Portfolio	Replace all instances of frontcon with Portfolio.

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.

`transprobbytotals` errors when using the algorithm input argument

The `'totals'` input argument to transprobbytotals 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 transprobbytotals. If you specify an `'algorithm'` argument as a name-value pair when calling transprobbytotals, you now receive an error.

Compatibility Considerations

Specifying the`'algorithm'` as a name-value pair argument to transprobbytotals 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 transprobbytotals, and that the `'totals'` input argument to transprobbytotals 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
cfspread	Calculate the spread over a zero curve for a given cash flow.
cfprice	Calculate the price for a given cash flow given yield to maturity.
cfyield	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 transprobgrouptotals 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 `proddf` with bndprice.
`proddfl`	Warns	bndprice	Replace all instances of `proddfl` with bndprice.
`proddl`	Warns	bndprice	Replace all instances of `proddl` with bndprice.
`yldoddl`	Warns	bndyield	Replace all instances of `yldoddl` with bndyield.
`yldoddf`	Warns	bndyield	Replace all instances of `yldoddf` with bndyield.
`yldoddfl`	Warns	bndyield	Replace all instances of `yldoddfl` with bndyield.
`prbond`	Warns	bndprice	Replace all instances of `prbond` with bndprice.
`yldbond`	Warns	bndyield	Replace all instances of `yldbond` with bndyield.
`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.

transprobbytotals Warns When Using the algorithm Input Argument

The `totals` input to transprobbytotals 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 transprobbytotals.

Compatibility Considerations

In a future release, specifying the `algorithm` argument to transprobbytotals 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, transprobbytotals, 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
accrfrac	Calculate fraction of coupon period before settlement.
bndprice	Price fixed-income security from yield to maturity.
bndyield	Calculate yield to maturity for fixed-income security.
bndspread	Calculate static spread over spot curve.
bnddurp	Calculate bond duration given price.
bnddury	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:

- accrfrac
- 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:

- accrfrac
- 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

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:

- ecmlsrmle
- ecmmvnrmle

- ecmmvnrfish
- ecmmvnrobj
- ecmmvnrstd
- mvnrfish
- mvnrmle
- 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:

- accrfrac
- 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 (todaily, 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 plyd2zero

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

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

mvnrmle	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
ecmmvnrmle	Multivariate normal regression with missing data
ecmmvnrobj	Log-likelihood function for multivariate normal regression with missing data
ecmmvnrstd	Evaluate standard errors for multivariate normal regression model

Least Squares Regression With Missing Data (Expectation Conditional Maximization)

ecmlsrmle	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