

Financial Toolbox™ Release Notes



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Financial Toolbox™ Release Notes

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R2014a

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R2011b

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R2010a

No New Features or Changes

R2009b

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R2009a

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R2008b

No New Features or Changes

R2008a

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R14SP3

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R2017b

Version: 5.10

New Features

Bug Fixes

Credit Scorecards: Support weights in credit scorecards

You can specify weights by using an optional name-value pair argument `WeightsVar` when creating a `creditscorecard` object. Also, weights are explicitly supported for the following credit scorecard functions:

- `creditscorecard`
- `bininfo`
- `fitmodel`
- `validatemodel`

R2017a

Version: 5.9

New Features

Bug Fixes

Compatibility Considerations

Default Probability Modeling: Bootstrap default probabilities from bonds using Jarrow-Turnbull model

Bootstrap default probabilities from bonds using Jarrow-Turnbull model with `bondDefaultBootstrap`.

Credit Scorecards: Support strings in credit scorecard

Support for strings in the data input argument for credit scorecard functions: `creditscorecard`, `bindata`, `score`, `probdefault`, and `validatemodel`.

Financial Time Series app removal for Database Toolbox support

When working with the Financial Time Series app, the **Database Toolbox** selection is removed from **File > Load**.

Compatibility Considerations

| Menu Item Name | What Happens When You Use This Menu Item | Use This Menu Item Instead | Compatibility Considerations |
|-----------------------|---|---|--|
| File > Load | Database Toolbox selection is removed. | Financial Time Series app no longer supports an interface to Database Toolbox™. | Use Database Toolbox directly and export data to a file or the MATLAB® workspace to then use with the Financial Time Series app. |

R2016b

Version: 5.8

New Features

Bug Fixes

Compatibility Considerations

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.
- `creditlexposures` 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

Version: 5.7

New Features

Bug Fixes

Compatibility Considerations

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 `'datetime'` or a `'datetime'`. The default behavior is `'datetime'`.
- `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 |
|-----------------------|---|---------------------------|---|
| <code>proddf</code> | Removed | <code>bndprice</code> | Replace all instances of <code>proddf</code> with <code>bndprice</code> . |
| <code>proddf1</code> | Removed | <code>bndprice</code> | Replace all instances of <code>proddf1</code> with <code>bndprice</code> . |
| <code>proddl</code> | Removed | <code>bndprice</code> | Replace all instances of <code>proddl</code> with <code>bndprice</code> . |
| <code>yldodd1</code> | Removed | <code>bndyield</code> | Replace all instances of <code>yldodd1</code> with <code>bndyield</code> . |
| <code>yldoddf</code> | Removed | <code>bndyield</code> | Replace all instances of <code>yldoddf</code> with <code>bndyield</code> . |
| <code>yldoddf1</code> | Removed | <code>bndyield</code> | Replace all instances of <code>yldoddf1</code> with <code>bndyield</code> . |
| <code>prbond</code> | Removed | <code>bndprice</code> | Replace all instances of <code>prbond</code> with <code>bndprice</code> . |
| <code>yldbond</code> | Removed | <code>bndyield</code> | Replace all instances of <code>yldbond</code> with <code>bndyield</code> . |
| <code>checksiz</code> | Removed | N/A | Remove all instances from your code. |
| <code>checktyp</code> | Removed | N/A | Remove all instances from your code. |

| Function Name | What Happens When You Use This Function | Use This Function Instead | Compatibility Considerations |
|---------------|---|---------------------------|--------------------------------------|
| 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 |
|---------------------|---|---------------------------|--|
| <code>ugarch</code> | Errors | <code>estimate</code> | Replace all instances of <code>ugarch</code> with the <code>garch</code> object to create conditional variance models and use the <code>estimate</code> 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.

ugarchl1f removal

`ugarchl1f` 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 |
|---------------|---|---------------------------|---|
| ugarchl1f | Errors | garch | Replace all instances of <code>ugarchl1f</code> with <code>garch</code> . |

For more information on migrating `ugarchl1f` 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 <code>ugarchpred</code> with the <code>garch</code> object to create conditional variance models and use the <code>forecast</code> 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 |
|------------------------|---|---------------------------|---|
| <code>ugarchsim</code> | Errors | <code>simulate</code> | Replace all instances of <code>ugarchsim</code> with the <code>garch</code> object to create conditional variance models and use the <code>simulate</code> 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 |
|-----------------------|---|---------------------------|--|
| <code>frontcon</code> | Errors | <code>Portfolio</code> | Replace all instances of <code>frontcon</code> with <code>Portfolio</code> . |

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 |
|----------------------|---|---------------------------|--|
| <code>portopt</code> | Error if <code>ConSet</code> or <code>varargin</code> input arguments are used. | <code>Portfolio</code> | If you want to solve a portfolio problem that is more than a long-only fully invested portfolio, replace all instances of <code>portopt</code> with <code>Portfolio</code> . |

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

R2015b

Version: 5.6

New Features

Bug Fixes

Compatibility Considerations

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 5-3.
 - `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 5-3.
 - `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 5-3.
 - `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 5-3.
 - `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

`ugarch` 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 |
|---------------|---|---------------------------|--|
| ugarch | Warns | estimate | Replace all instances of <code>ugarch</code> with the <code>garch</code> object to create conditional variance models and use the <code>estimate</code> 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](#).

ugarchl1f removal

`ugarchl1f` 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 |
|---------------|---|---------------------------|---|
| ugarchl1f | Warns | garch | Replace all instances of <code>ugarchl1f</code> with <code>garch</code> . |

For more information on migrating `ugarchl1f` code to `garch`, see [Specify GARCH Models Using `garch`](#).

ugarchpred removal

`ugarchpred` 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 |
|-------------------------|---|---------------------------|---|
| <code>ugarchpred</code> | Warns | <code>forecast</code> | Replace all instances of <code>ugarchpred</code> with the <code>garch</code> object to create conditional variance models and use the <code>forecast</code> 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` 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 |
|------------------------|---|---------------------------|---|
| <code>ugarchsim</code> | Warns | <code>simulate</code> | Replace all instances of <code>ugarchsim</code> with the <code>garch</code> object to create conditional variance models and use the <code>simulate</code> 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 |
|-----------------------|---|---------------------------|--|
| <code>frontcon</code> | Removed | <code>Portfolio</code> | Replace all instances of <code>frontcon</code> with <code>Portfolio</code> . |

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 |
|----------------------|--|---------------------------|--|
| <code>portopt</code> | Error if <code>ConSet</code> or <code>varargin</code> input arguments are used | <code>Portfolio</code> | If you want to solve a portfolio problem that is more than a long-only fully invested portfolio, replace all instances of <code>portopt</code> with <code>Portfolio</code> . |

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

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', 'N'})
```

- 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 |
|-----------------------|---|---------------------------|--|
| <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 |
|----------------------|---|---------------------------|--|
| <code>portopt</code> | Warns | <code>Portfolio</code> | If you want to solve a portfolio problem that is more than a long-only fully invested portfolio, replace all instances of <code>portopt</code> with <code>Portfolio</code> . |

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`
- `hvw`
- `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 |
|-----------------------|--|
| <code>cfspread</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 `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. |
| proddf1 | Warns | bndprice | Replace all instances of proddf1 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. |
| yldoddf1 | Warns | bndyield | Replace all instances of yldoddf1 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.

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`, `transprobbytals`, 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`
- `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:

- `ecmlsrml`
- `ecmmvnrml`
- `ecmmvnrfish`
- `ecmmvnrobj`
- `ecmmvnrstd`
- `mvnrfish`
- `mvnrml`
- `mvnrrobj`
- `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 (`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 `plyd2zero`

Continuous compounding is no longer available for `plyd2zero`. Compounding for this function is now consistent with compounding for the function `zero2plyd`. 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 24-3
- “Multivariate Normal Regression With Missing Data (Expectation Conditional Maximization)” on page 24-3
- “Least Squares Regression With Missing Data (Expectation Conditional Maximization)” on page 24-3
- “Financial Model Transformation Function” on page 24-3

Multivariate Normal Regression Without Missing Data

| | |
|----------|---|
| mvnrfish | Fisher information matrix for multivariate normal or least-squares regression |
| mvnrmlc | 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 |
| ecmmvnrmlc | 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)

| | |
|-----------|--|
| ecmlsrmlc | 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

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