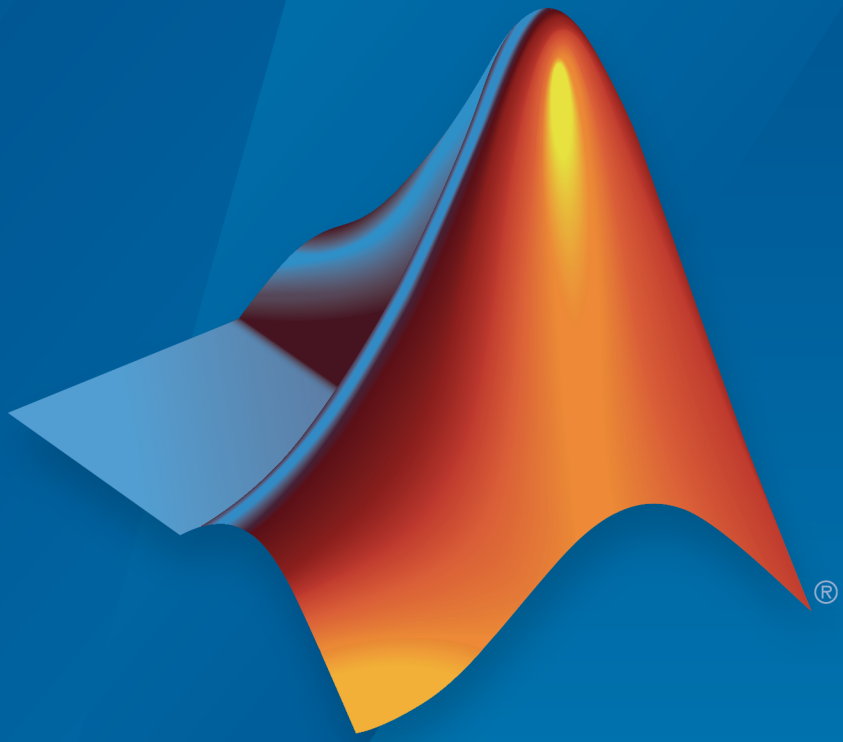
Econometrics Toolbox™ Release Notes



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Econometrics Toolbox™ Release Notes

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R2016a

Version: 3.4

New Features

Compatibility Considerations

Cusum Structural Change Tests: Assess stability of multiple linear regression models

The `cusumtest` function implements the Brown-Durbin-Evans cusum test to assess the stability of coefficients over time in multiple linear regression models. `cusumtest` supports:

- Both cusum and cusum of squares tests
- Estimating recursive residuals using forward and backward regressions
- Plotting recursive residuals with critical lines

Recursive Linear Regression: Recursively estimate coefficients of multiple linear regression models

The `recreg` function plots estimated, multiple linear regression model coefficients from recursive linear regressions to examine the stability of the coefficients over time. `recreg` supports:

- Nested or rolling-window subsamples of the data
- Estimating coefficients and standard errors using ordinary-least-squares (OLS) or robust methods (HAC and FGLS)

Functionality being removed

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`vartovec`	Errors	`var2vec`	Replace all existing instances of `vartovec` with the correct `var2vec` syntax.
`vectovar`	Errors	`vec2var`	Replace all existing instances of

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
			`vectovar` with the correct `vec2var` syntax.

R2015b

Version: 3.3

New Features

Compatibility Considerations

Model Conversion Functions: Convert between VEC models and VAR models

Given known coefficient matrices of the first difference terms in a VEC model, the vec2var function returns the autoregressive coefficient matrices of the equivalent VAR model representation.

Given known, autoregressive coefficient matrices of a VAR model, the var2vec function returns the coefficient matrices of the first difference and error correction terms of the equivalent VEC model representation.

Diffuse Kalman Filter: Model state-space systems having diffuse initial state distributions

The `dssm` model object applies the diffuse Kalman filter to obtain exact filtered and smoothed states in the presence of states having infinite initial distribution variance.

Specify a diffuse state-space model using dssm, identify the diffuse states, and then:

- Estimate its parameters using estimate.
- Implement forward recursion of the state-space model using filter.
- Implement backward recursion of the state-space model using smooth.
- Forecast states and observations using forecast.

Chow Structural Change Test: Assess stability of multiple linear regression models

The chowtest function implements a variety of Chow tests to assess the stability of coefficients over time in multiple linear regression models. The framework supports both “breakpoint” and “forecast” tests, and the testing of specific coefficient subsets.

ARMAIRF Function: Calculate impulse responses for ARMA models

The armairf function filters innovation shocks through each variable in a multivariate autogressive, moving average model, and returns the response as a numeric array or a impulse response plot.

New Data Set

Econometrics Toolbox™ includes a new data set containing U.S. food consumption statistics, 1927–1962. Load the data set using `load Data_Consumption`. The reference that analyzes the data is Maddala, G. S. *Introduction to Econometrics.* 2nd Ed., New York, NY: Macmillan, 1992.

Functionality being removed

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchar`	Errors	arma2ar	Replace all existing instances of `garchar` with the correct `arma2ar` syntax.
`garchma`	Errors	arma2ma	Replace all existing instances of `garchma` with the correct `arma2ma` syntax.
`vartovec`	Warns	var2vec	Replace all existing instances of `vartovec` with the correct `var2vec` syntax.
`vectovar`	Warns	vec2var	Replace all existing instances of `vectovar` with the correct

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
			`vec2var` syntax.

R2015a

Version: 3.2

New Features

Compatibility Considerations

State-space example for Diebold-Li model

The example analyzes yield curves derived from government bond data using the popular Diebold-Li yields-only model in the state-space model framework: Using the Kalman Filter to Estimate and Forecast the Diebold-Li Model.

Autoregressive moving average (ARMA) to AR and MA conversions

Given coefficient values for lagged terms of an ARMA model, the arma2ar function returns the coefficients of the truncated AR model, and arma2ma function returns the coefficients of the truncated MA model.

Functionality being removed

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchar`	Warns	arma2ar	Replace all existing instances of `garchar` with the correct `arma2ar` syntax.
`garchma`	Warns	arma2ma	Replace all existing instances of `garchma` with the correct `arma2ma` syntax.

R2014b

Version: 3.1

New Features

Compatibility Considerations

Simulation smoothing for state-space models

The ssm model object has the method simsmooth for sampling from the posterior distribution of the states using forward filtering, backward sampling.

Feasible generalized least squares (FGLS) estimators

The fgls function uses generalized least squares (GLS) to estimate coefficients and standard errors in multiple linear regression models with nonspherical errors by first estimating the covariance of the innovations process.

Time-series regression example

The example, following a series of time series regression examples, illustrates how to estimate multiple linear regression models of time series data in the presence of heteroscedastic or autocorrelated (nonspherical) innovations: Time Series Regression X: Generalized Least Squares and HAC Estimators.

Shipped data sets now support tabular arrays

Econometrics Toolbox data sets organize data in tabular arrays rather than dataset arrays.

Compatibility Considerations

To access or modify a tabular array, you must use `table` indexing and functions. For details, see Tables.

Functions now support tabular arrays

hac, i10test, corrplot, and collintest accept tabular arrays as input arguments. jcitest returns tabular arrays.

Compatibility Considerations

To access or modify the output tables of `jcitest`, you must use `table` indexing and functions. For details, see Tables.

R2014a

Version: 3.0

New Features

Compatibility Considerations

Time-invariant and time-varying, linear, Gaussian state-space models

Econometrics Toolbox has a model for performing univariate and multivariate time-series data analysis.

- The ssm model supports time-invariant and time-varying, linear state-space models.
- Specify a state-space model using `ssm`, and then:
  - Estimate its parameters using estimate.
  - Implement forward recursion of the state-space model using filter.
  - Implement backward recursion of the state-space model using smooth.
  - Simulate states and observations using simulate.
  - Forecast states and observations using forecast.

Kalman filter with missing data

The methods of the state-space model, ssm, use the Kalman filter to estimate the states, and also use this framework to manage missing data.

Performance enhancements for ARIMA and GARCH models

The `estimate` methods of the arima, egarch, garch, gjr, and regARIMA models have been enhanced to converge more quickly, and, therefore, you might experience faster estimation durations.

SDE functions moved from Econometrics Toolbox to Financial 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
- cev
- ts2func

Data set and example functions moved from Econometrics Toolbox to Financial Toolbox

The following data set and example functions from the `matlab/toolbox/econ/econdemos` folder 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`

Functionality being removed

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchcount`	Errors	`sum(any(EstParamCov))`, where `EstParamCov` is an estimated	N/A

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
		parameter covariance matrix of a fitted arima, garch, egarch, or gjr model	
`garchdisp`	Errors	print method of the classes	Replace all existing instances of `garchdisp` with the correct `print` syntax.
`garchfit`	Errors	estimate method of the classes arima, garch, egarch, or gjr	Replace all existing instances of `garchfit` with the correct `estimate` syntax.
`garchget`	Errors	arima, garch, egarch, or gjr	Specify a model using the appropriate model creator `arima`, `garch`, `egarch`, or `gjr`. Use Dot Notation to retrieve parameter values from the model.
`garchinfer`	Errors	infer method of the classes arima, garch, egarch, or gjr	Replace all existing instances of `garchinfer` with the correct `infer` syntax.

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchplot`	Errors	N/A	N/A
`garchpred`	Errors	forecast method of the classes arima, garch, egarch, or gjr	Replace all existing instances of `garchpred` with the correct `forecast` syntax.
`garchset`	Errors	arima, garch, egarch, or gjr	Specify a model using the appropriate model creator `arima`, `garch`, `egarch`, or `gjr`. Use Dot Notation to set parameter values for the model.
`garchsim`	Errors	simulate method of the classes arima, garch, egarch, or gjr	Replace all existing instances of `garchsim` with the correct `simulate` syntax.

R2013b

Version: 2.4

New Features

Compatibility Considerations

Regression models with ARIMA errors

Econometrics Toolbox has a new model for performing time series regression analysis.

- The regARIMA model supports linear regression models with ARIMA error processes, including AR, MA, ARMA, and seasonal error models.
- Specify a regression model with ARIMA errors using `regARIMA`, then
  - Estimate its parameters using the data and estimate.
  - Simulate responses using simulate.
  - Forecast responses using forecast.
  - Infer residuals using infer.
  - Filter innovations using filter.
  - Plot an impulse response using impulse.
  - Convert it to an ARIMA model using arima.

Time series regression example for lag order selection

The example, following a series of time series regression examples, illustrates predictor history selection for multiple linear regression models: Time Series Regression IX: Lag Order Selection.

`optimoptions` support

optimoptions support when using solver optimization options to:

- Estimate arima models using estimate.
- Estimate garch models using estimate.
- Estimate egarch models using estimate.
- Estimate gjr models using estimate.

Compatibility Considerations

When estimating arima, garch, egarch, or gjr models using `estimate`, the default solver options now reference an optimoptions object, instead of an optimset structure. If you now use default solver options and operate on them assuming this is an optimset structure, some operations might not work.

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

Estimation display options

The options for the Command Window display of arima/estimate, garch/estimate, egarch/estimate, and gjr/estimate is simplified and enhanced. You can easily:

- Display only the maximum likelihood parameter estimates, standard errors, and *t* statistics. This is the new default.
- Display only iterative optimization information.
- Display only optimization diagnostics.
- Display all of the above.
- Turn off all output.

Compatibility Considerations

The new, recommended name-value pair argument that controls the display is `Display`. However, the software still supports the previous name-value pair argument, `print`.

Functionality being removed

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchcount`	Warns	Use `sum(any(EstParamCov))`, where `EstParamCov` is an estimated parameter covariance matrix of a fitted arima, garch, egarch, or gjr model.	N/A
`garchdisp`	Warns	print method of the classes	Replace all existing instances of `garchdisp` with the correct `print` syntax.

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchfit`	Warns	estimate method of the classes arima, garch, egarch, and gjr	Replace all existing instances of `garchfit` with the correct `estimate` syntax.
`garchget`	Warns	arima, garch, egarch, and gjr	Specify a model using the appropriate model creator `arima`, `garch`, `egarch`, or `gjr`. Use Dot Notation to retrieve parameter values from the model.
`garchinfer`	Warns	infer method of the classes arima, garch, egarch, and gjr	Replace all existing instances of `garchinfer` with the correct `infer` syntax.
`garchplot`	Warns	N/A	N/A
`garchpred`	Warns	forecast method of the classes arima, garch, egarch, and gjr	Replace all existing instances of `garchpred` with the correct `forecast` syntax.

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchset`	Warns	arima, garch, egarch, and gjr	Specify a model using the appropriate model creator `arima`, `garch`, `egarch`, or `gjr`. Use Dot Notation to set parameter values for the model.
`garchsim`	Warns	simulate method of the classes arima, garch, egarch, and gjr	Replace all existing instances of `garchsim` with the correct `simulate` syntax.

R2013a

Version: 2.3

New Features

Compatibility Considerations

Heteroscedasticity and autocorrelation consistent (HAC) covariance estimators

The new hac function estimates robust covariances for ordinary least squares coefficients of multiple linear regression models under general forms of heteroscedasticity and autocorrelation.

Regression component added to ARIMA models

You can include a regression component to an arima model to measure the linear effects that exogenous covariate series have on a response series. This new functionality also enhances estimate, filter, forecast, infer, and simulate.

Compatibility Considerations

This new `arima` functionality replaces `garchfit`, `garchdisp`, `garchinfer`, `garchget`, `garchset`, `garchpred`, and `garchsim`. Change all instances of those functions using the new `arima` syntax.

Changes to `lmctest`

lmctest uses estimate rather than `garchfit` to calculate the MLEs under the alternative hypothesis.

Compatibility Considerations

You might receive slightly different estimates and, in some cases, p-values for the same data under the previous functionality of `lmctest`.

Functionality being removed

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchcount`	Warns	Use `sum(any(EstParamCov))`, where `EstParamCov` is an estimated parameter covariance matrix of a fitted arima, garch, egarch, or gjr model.	N/A

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchdisp`	Warns	print method of the classes	Replace all existing instances of `garchdisp` with the correct `print` syntax.
`garchfit`	Warns	estimate method of the classes arima, garch, egarch, and gjr	Replace all existing instances of `garchfit` with the correct `estimate` syntax.
`garchget`	Warns	arima, garch, egarch, and gjr	Specify a model using the appropriate model creator `arima`, `garch`, `egarch`, or `gjr`. Use Dot Notation to retrieve parameter values from the model.
`garchinfer`	Warns	infer method of the classes arima, garch, egarch, and gjr	Replace all existing instances of `garchinfer` with the correct `infer` syntax.
`garchplot`	Warns	N/A	N/A

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`garchpred`	Warns	forecast method of the classes arima, garch, egarch, and gjr	Replace all existing instances of `garchpred` with the correct `forecast` syntax.
`garchset`	Warns	arima, garch, egarch, and gjr	Specify a model using the appropriate model creator `arima`, `garch`, `egarch`, or `gjr`. Use Dot Notation to set parameter values for the model.
`garchsim`	Warns	simulate method of the classes arima, garch, egarch, and gjr	Replace all existing instances of `garchsim` with the correct `simulate` syntax.

R2012b

Version: 2.2

New Features

Impulse response (dynamic multipliers) for ARIMA models

The arima model object has a new impulse method for generating and plotting impulse response functions for ARIMA models.

Filter user-specified disturbances through ARIMA and conditional variance models

There are new methods to filter user-specified disturbances through ARIMA and conditional variance models:

- filter for arima model objects to filter disturbances through an ARIMA process.
- filter for garch model objects to filter disturbances through a GARCH process.
- filter for egarch model objects to filter disturbances through an EGARCH process.
- filter for gjr model objects to filter disturbances through a GJR process.

A series of new examples on time-series regression techniques

Eight new examples that illustrate common principles and tasks in time-series regression modeling:

- Time Series Regression I: Linear Models
- Time Series Regression II: Collinearity and Estimator Variance
- Time Series Regression III: Influential Observations
- Time Series Regression IV: Spurious Regression
- Time Series Regression V: Predictor Selection
- Time Series Regression VI: Residual Diagnostics
- Time Series Regression VII: Forecasting
- Time Series Regression VIII: Lagged Variables and OLS Estimator Bias

R2012a

Version: 2.1

New Features

New Model Objects and Their Functions

Econometrics Toolbox has four new model objects for modeling univariate time series data.

- The arima model object supports ARIMA processes, including AR, MA, ARMA, and seasonal models.
- For modeling conditionally heteroscedastic series, there are new garch, egarch, and gjr model objects, supporting GARCH models and the EGARCH and GJR variants.

Five new functions for each model object simplify the modeling workflow: `estimate`, `infer`, `forecast`, `print`, and `simulate`.

New Utility Functions

Four new utility functions assist in time series analysis:

- corrplot plots predictor correlations.
- collintest performs Belsley collinearity diagnostics.
- i10test conducts paired integration and stationarity tests.
- recessionplot adds recession bands to time series plots.

Demo for Static Time Series Model Specification

A new demo, "Specifying Static Time Series Models," steps through the model specification workflow for static multiple linear regression models.

Steps include:

- Detecting multicollinearity
- Identifying influential observations
- Testing for spurious regression due to integrated data
- Selecting predictor subsets using stepwise regression and `lasso`
- Conducting residual diagnostics
- Forecasting

The demo uses many tools from Econometrics Toolbox, and introduces new utility functions useful for model specification.

To run the demo in the Command Window, use the command `showdemo Demo_StaticModels`.

New Data Sets

Econometrics Toolbox includes two new data sets:

- **Data_CreditDefaults**. Historical data on investment-grade corporate bond defaults and four predictors, 1984–2004. Data are those used in: Loeffler, G., and P. N. Posch. *Credit Risk Modeling Using Excel and VBA*. West Sussex, England: Wiley Finance, 2007.
- **Data_Recessions**. U.S. recession start and end dates from 1857 to 2011. Source: National Bureau of Economic Research. "U.S. Business Cycle Expansions and Contractions." `http://www.nber.org/cycles.html`.

R2011b

Version: 2.0.1

New Features

Compatibility Considerations

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.

R2011a

Version: 2.0

New Features

New Cointegration Functionality

Econometrics Toolbox now offers functions for cointegration testing and modeling. The egcitest function uses Engle-Granger methods to test for individual cointegrating relationships, and estimates their parameters. The jcitest function uses Johansen methods to test for multiple cointegrating relationships, and estimates parameters in corresponding vector error-correction models. The jcontest function tests linear restrictions on both error-correction speeds and the space of cointegrating vectors, and estimates restricted model parameters.

Convert Vector Autoregressive Models to and from Vector Error-Correction Models

The functions vectovar and vartovec allow you to convert between vector autoregressive (VAR) models and vector error-correction (VEC) models.

Data Sets for Calibrating Economic Models

Econometrics Toolbox includes three new data sets:

- **Data_Canada**. Mackinnon's data on inflation and interest rates in Canada, 1954–1994. Data are those used in: MacKinnon, J. G. "Numerical Distribution Functions for Unit Root and Cointegration Tests." *Journal of Applied Econometrics*. v. 11, 1996, pp. 601–618.
- **Data_JDanish**, **Data_JAustralian**. Johansen's data on money and income in Denmark, 1974–1987, and Australia/U.S. purchasing power and interest parity, 1972–1991. Data are those used in: Johansen, *Likelihood-Based Inference in Cointegrated Vector Autoregressive Models*. Oxford: Oxford University Press, 1995.

R2010b

Version: 1.4

New Features

Compatibility Considerations

Functions Being Removed

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`dfARDTest`	Error	adftest	The new function syntax differs. Replace all existing instances of `dfARDTest` with the correct adftest syntax.
`dfARTest`	Error	adftest	The new function syntax differs. Replace all existing instances of `dfARTest` with the correct adftest syntax.
`dfTSTest`	Error	adftest	The new function syntax differs. Replace all existing instances of `dfTSTest` with the correct adftest syntax.
`ppARDTest`	Error	pptest	The new function syntax differs. Replace all existing instances of `ppARDTest` with the correct pptest syntax.
`ppARTest`	Error	pptest	The new function syntax differs. Replace all existing instances of `ppARTest` with the correct pptest syntax.
`ppTSTest`	Error	pptest	The new function syntax differs. Replace all existing instances of `ppTSTest` with the correct pptest syntax.

Additional Syntax Options for archtest and lbqtest

The functions archtest and lbqtest now take name-value pair arguments as inputs. The old syntax of individual arguments will continue to work but will not be documented.

New Data Set for Calibrating Economic Models

The economic data from the paper by Nielsen and Risager, "Stock Returns and Bond Yields in Denmark, 1922–99," (Department of Economics, Copenhagen Business School; Working paper 3-2001, 2001) is now included with Econometrics Toolbox in the file `Data_Danish`.

R2010a

Version: 1.3

New Features

Compatibility Considerations

Functions Being Removed

Function Name	What Happens When You Use This Function?	Use This Function Instead	Compatibility Considerations
`dfARDTest`	Error	adftest	The new function syntax differs. Replace all existing instances of `dfARDTest` with the correct adftest syntax.
`dfARTest`	Error	adftest	The new function syntax differs. Replace all existing instances of `dfARTest` with the correct adftest syntax.
`dfTSTest`	Error	adftest	The new function syntax differs. Replace all existing instances of `dfTSTest` with the correct adftest syntax.
`ppARDTest`	Error	pptest	The new function syntax differs. Replace all existing instances of `ppARDTest` with the correct pptest syntax.
`ppARTest`	Error	pptest	The new function syntax differs. Replace all existing instances of `ppARTest` with the correct pptest syntax.
`ppTSTest`	Error	pptest	The new function syntax differs. Replace all existing instances of `ppTSTest` with the correct pptest syntax.

Demo Showing Multivariate Modeling of the U.S. Economy

A new demo, "Modeling the United States Economy," develops a small macroeconomic model. This model is used to examine the impact of various shocks on the United States economy, particularly around the period of the 2008 fiscal crisis. It uses the multiple time series tools from the Econometrics Toolbox.

To run the demo in the command window, use the command `echodemo Demo_USEconModel`.

Lag Operator Polynomial Objects

The new LagOp polynomial class provides methods to create and manipulate lag operator polynomials and filter time series data, as well as methods to perform polynomial algebra including addition, subtraction, multiplication, and division.

Leybourne-McCabe Test for Stationarity

The new Leybourne-McCabe test function lmctest assesses the null hypothesis that a univariate time series y is a trend-stationary AR(p) process against the alternative that y is a nonstationary ARIMA(p,1,1) process.

Historical Data Sets for Calibrating Economic Models

The new data set `Data_SchwertMacro` contains original data from G. William Schwert's article "Effects of Model Specification on Tests for Unit Roots in Macroeconomic Data," (*Journal of Monetary Economics*, Vol. 20, 1987, pp. 73–103.). These data are a benchmark for unit root tests. The new data set `Data_SchwertStock` contains indices of U.S. stock prices as published in G. William Schwert's article "Indexes of U.S. Stock Prices from 1802 to 1987," (*The Journal of Business*,Vol. 63, 1990, pp. 399–42.). The new data set `Data_USEconModel`contains the macroeconomic series for the new demo `Demo_USEconModel`.

New Organization and Naming Standard for Data Sets

Econometrics Toolbox has a new set of naming conventions for data sets. Data set names are prefixed by `Data_`.

For full information on the available data sets, demos, and examples, see Data Sets, Demos, and Example Functions or type `help econ/econdemos` at the command line. For more information on Dataset Array objects, see dataset in the Statistics Toolbox™ documentation.

Compatibility Considerations

Replace any instances of `load Old_Data` with `load` and the new file name.

New Naming Convention for Demos and Example Functions

All demos and examples in the Econometrics Toolbox have been moved to the folder `econ/econdemos` and renamed according to the following convention:

- Demos are named `Demo_DemoName`
- Examples are named `Example_ExampleName`

Compatibility Considerations

Replace any instances of example functions with their new names. For full information on the available, demos, and examples, see Data Sets, Demos, and Example Functions or type `help econ/econdemos` at the command line.

R2009b

Version: 1.2

New Features

Compatibility Considerations

Unit Root Tests

There are now four classes of unit root tests. More information on the tests is available in the Unit Root Nonstationarity section of the User's Guide.

Dickey-Fuller and Phillips-Perron Tests

Dickey-Fuller and Phillips-Perron tests now have single interfaces, with new capabilities for multiple testing. Both adftest and pptest test a unit root null hypothesis against autoregressive, autoregressive with drift, or trend-stationary alternatives.

KPSS Test

The new kpsstest function tests a null hypothesis of (trend) stationarity against nonstationary unit root alternatives.

Variance Ratio Test

The new vratiotest function tests a null hypothesis of a random walk against alternatives with innovations that are not independent and identically distributed.

Compatibility Considerations

The `ardtest` function replaces the `dfARDTest`, `dfARTest`, and `dfTSTest` functions. The `pptest` function replaces the `ppARDTest`, `ppARTest`, and `ppTSTest` functions. The new function syntax differs from the functions they replace.

Financial Toolbox Required

Econometrics Toolbox requires Financial Toolbox as of this version.

Nelson-Plosser Data

The Nelson and Plosser [50] data set is now available. To access the data, enter `load Data_NelsonPlosser` at the MATLAB® command line.

R2009a

Version: 1.1

New Features

Compatibility Considerations

Hypothesis Tests

There are two new hypothesis tests for model misspecification:

- Lagrange Multiplier tests, lmtest
- Wald tests, waldtest

Furthermore, the likelihood ratio test, lratiotest, has been enhanced to be able to "test up" as well as "test down" when performing multiple model comparisons. It now accepts vectors of model parameters for restricted log likelihoods, for unrestricted log likelihoods, or for both.

There is a new demo about these tests; see "New Demo" on page 15-3.

Compatibility Considerations

`lratiotest` error messages and message IDs differ from previous versions.

Structural VAR, VARX, and VARMAX models

Econometrics Toolbox multiple time series functions now include structural multiple time series. Structural models have the general form

$$A_0 Y_t = a + X_t b + \sum_{i=1}^{p} A_i Y_{t-i} + \sum_{j=1}^{q} B_j W_{t-j} + B_0 W_t.$$

Previously, Econometrics Toolbox multiple time series functions addressed models of the form

$$Y_t = a + X_t b + \sum_{i=1}^{p} A_i Y_{t-i} + \sum_{j=1}^{q} B_i W_{t-j} + W_t.$$

The mathematical difference is the inclusion of A_0 and B_0 matrices. These matrices allow practitioners to specify structural dependencies between variables. For more information, see the Multivariate Time Series Models chapter of the Econometrics Toolbox User's Guide.

Compatibility Considerations

Objects created with the Econometrics Toolbox V1.0 `vgxset` function, and saved in MAT files, do not work with Econometrics Toolbox V1.1 functions. Recreate the objects with the Econometrics Toolbox V1.1 `vgxset` function.

New Demo

There is a new demo on hypothesis tests. Run the demo at the MATLAB command line by entering `showdemo classicalTestsDemo`.

R2008b

Version: 1.0

New Features

Multivariate VAR, VARX, and VARMA Models

A new suite of functions, listed in the following table, adds support for multivariate VAR, VARX, and VARMA models.

Function	Description
vgxar	Convert VARMA specification into a pure vector autoregressive (VAR) model
vgxcount	Count restricted and unrestricted parameters in VAR or VARX models
vgxdisp	Display VGX model parameters and standard errors in different formats
vgxget	Get multivariate time-series specification parameters
vgxinfer	Infer innovations of a VGX process
vgxloglik	Compute conditional log-likelihoods of VGX process
vgxma	Convert VARMA specification into a pure vector moving average (VMA) model
vgxplot	Plot multivariate time series process
vgxpred	Generate transient response of VGX process during a specified forecast period
vgxproc	Generate a VGX process from an innovations process
vgxqual	Determine if a VGX process is stable and invertible
vgxset	Set or modify multivariate time-series specification parameters
vgxsim	Simulate VGX processes
vgxvarx	Solve VAR or VARX model using maximum likelihood estimation

Heston Stochastic Volatility Models

The new heston function adds support for Heston stochastic volatility models to the SDE engine.

R2008a

Version: 2.4

New Features

Monte Carlo Simulation of Stochastic Differential Equations

The GARCH Toolbox™ software now allows you to model dependent financial and economic variables, such as interest rates and equity prices, via Monte Carlo simulation of multivariate diffusion processes. For more information, see Stochastic Differential Equations in the GARCH Toolbox documentation.

R2007b

Version: 2.3.2

New Features

Changes to garchsim

The `garchsim` function previously allowed you to specify the `State` argument as either a scalar or a time series matrix of standardized, independent, identically distributed disturbances to drive the output `Innovations` in a time series process. The `State` argument must now be a time series matrix. See the `State` input argument on the garchsim reference page for more information.

R2007a

Version: 2.3.1

No New Features or Changes

R2006b

Version: 2.3

New Features

Data Preprocessing

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

Demos

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

R2006a

Version: 2.2

New Features

User's Guide

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

Statistical Functions

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

Dickey-Fuller Unit Root Tests

Function	Purpose
`dfARDTest`	Augmented Dickey-Fuller unit root test based on AR model with drift.
`dfARTest`	Augmented Dickey-Fuller unit root test based on zero drift AR model.
`dfTSTest`	Augmented Dickey-Fuller unit root test based on trend stationary AR model.

Phillips-Perron Unit Root Tests

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

R14SP3

Version: 2.1

New Features

Compatibility Considerations

Changes to garchsim

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

Compatibility Considerations

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

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

In V2.1, if you do not specify a value for the `State` (formerly `Seed`) argument, garchsim uses the current state of rand and randn, rather than the initial state. Use the commands `s = rand('state')` and `s = randn('state')` to determine the current state of these random number generators. For more information, see the rand and randn reference pages.