Package ‘SBAGM’

October 28, 2020

Type Package
Title Search Best ARIMA, GARCH, and MS-GARCH Model
Version 0.1.0
Maintainer Rajeev Ranjan Kumar <rrk.uasd@gmail.com>
License GPL-3
Encoding UTF-8
LazyData true
RoxygenNote 7.1.1
Imports MSGARCH, forecast, rugarch
Depends R (>= 2.10)
NeedsCompilation no
Author Rajeev Ranjan Kumar [aut, cre],
Girish Kumar Jha [aut, ths, ctb],
Dwijesh C. Mishra [ctb],
Neeraj Budhlakoti [ctb]
Repository CRAN
Date/Publication 2020-10-28 08:40:05 UTC

R topics documented:

appgarch .............................................................. 2
appmsgarch ............................................................ 3
ARIMAAIC ............................................................ 5
ReturnSeries .......................................................... 6

Index 7
appgarch  

Find the appropriate ARMA-GARCH model

Description

The appgarch function computes RMSE and MAE of the all possible combinations of GARCH type model and distribution, and forecast value. Based on the lowest RMSE and MAE, we can find the best model and distribution combinations of the particular data.

Usage

```r
appgarch(data, methods = c("sGARCH", "gjrGARCH"),
          distributions = c("norm", "std", "snorm"), aorder = c(1, 0),
          gorder = c(1, 1), algo = "gosolnp", stepahead = 5)
```

Arguments

- **data**: Univariate time series data
- **methods**: Volatility models. Valid models are “sGARCH”, “eGARCH”, “gjrGARCH” and “csGARCH”. Default: methods= c("sGARCH", "gjrGARCH")
- **distributions**: The conditional density to use for the innovations. Valid choices are “norm” for the normal distribution, “snorm” for the skew-normal distribution, “std” for the student-t, “ssstd” for the skew-student, “ged” for the generalized error distribution, “sged” for the skew-generalized error distribution, “nig” for the normal inverse gaussian distribution, “ghyp” for the Generalized Hyperbolic, and “jsu” for Johnson’s SU distribution. Default: distributions= c("norm", "std", "snorm")
- **aorder**: ARMA order. Default: aorder=c(1, 0)
- **gorder**: GARCH order. Default: gorder=c(1, 1)
- **algo**: Solver. One of either “nlminb”, “solnp”, “lbfgs”, “gosolnp”, “nloptr” or “hybrid”. Default: algo = ”gosolnp”. (see documentation in the rugarch-package for details)
- **stepahead**: The forecast horizon.

Details

It allows for a wide choice in univariate GARCH models, distributions, and mean equation modelling. If the user provides the model combinations like methods= c("sGARCH", "eGARCH", "gjrGARCH") and distributions combination like distributions= c("norm", "std", "snorm") along with the other parameters, then get the RMSE and MAE value for all possible combinations of methods and distributions, which helps to find the best GARCH type model based on the lowest RMSE and MAE value.
Value

- rmse_mean: Root Mean Square Error (RMSE) value of the mean forecast for all combinations
- mae_mean: Mean Absolute Error (MAE) value of the mean forecast for all combinations
- forecast_mean: Mean forecast for all combinations
- forecast_sigma: Sigma value for all combinations

References


See Also

appmsgarch, ARIMAAIC

Examples

```r
data("ReturnSeries")
appgarch(ReturnSeries)
```

appmsgarch  

*Find the appropriate MS-GARCH model*

Description

The appmsgarch function computes the root mean square error (RMSE) and mean absolute error (MAE) of the different possible combinations of methods and distributions of the MS-GARCH model.

Usage

```r
appmsgarch(data, methods = c("sARCH", "sGARCH"), distributions = c("norm", "std"), stepahead = 5)
```

Arguments

- data: Input time series (ts) or numerical univariate series.
- methods: Combination of volatility models in two different regimes. Valid models are "sARCH", "sGARCH", "eGARCH", "gjrGARCH", and "tGARCH". Default: methods=c("sARCH", "sGARCH").
distributions List with element distribution. distribution is a character vector (of size 2) of conditional distributions. Valid distributions are "norm", "snorm", "std", "sstd", "ged", and "sged". Default: distribution = c("norm", "std").

stepahead The forecast horizon.

Details

Here Markov-Switching specification of the MS-GARCH model is based on the Haas et al. (2004a). For the methods, "sARCH" is the ARCH(1) model, "sGARCH" the GARCH(1,1) model, "eGARCH" the EGARCH(1,1) model, "gjrGARCH" the GJR(1,1) model (Glosten et al., 1993), and "tGARCH" the TGARCH(1,1) model (Zakoian, 1994). For the distributions, "norm" is the Normal distribution, "std" the Student-t distribution, and "ged" the GED distribution. Their skewed version, implemented via the Fernandez and & Steel (1998) transformation, are "snorm", "sstd" and "sged".

Value

forecast_msgarch Forecasted value of all possible combinations of methods and combinations.
rmse_mat Root mean square error (RMSE) value of all possible combinations of methods and combinations.
mae_mat Mean absolute error (MAE) value of all possible combinations of methods and combinations.

References


Examples

data("ReturnSeries")
appmsgarch(ReturnSeries)
Description

Computes the AIC values of all possible ARIMA models for the given value of autoregressive and moving average parameters.

Usage

ARIMAAIC(data, p=3, q=3, d=0, season=list(order=c(0,0,0),period=NA), in.mean=TRUE)

Arguments

- **data**: Univariate time series data
- **p**: Non-seasonal autoregressive order
- **q**: Non-seasonal moving average order
- **d**: Degree of differencing
- **season**: A specification of the seasonal part of the ARIMA model, plus the period. This should be a list with components order and period.
- **in.mean**: Should the ARMA model include a mean/intercept term? The default is TRUE for undifferenced series, and it is ignored for ARIMA models with differencing.

Details

Lower the AIC value better the model

Value

- **aic_mat**: AIC values of all possible ARIMA models

References


Examples

```r
data("ReturnSeries")
ARIMAAIC(ReturnSeries)
```
Description

Monthly return series of International Soyabean oil starting from January 1980

Usage

data("ReturnSeries")

Format

A data frame with 86 observations on the following variable.

return  a numeric vector

Details

Dataset contain 86 observations of monthly return series of International soyabean price. It is obtained from World Bank "Pink sheet"

Source


References


Examples

data(ReturnSeries)
Index

* datasets
  ReturnSeries, 6

appgarch, 2
appmsgarch, 3
ARIMAIC, 5

ReturnSeries, 6