Package 'MCS'

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Type Package

Title Model Confidence Set Procedure

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Depends R(>= 3.0.1)

Description
Perform the model confidence set procedure of Hansen et al (2011) <doi:10.3982/ECTA5771>.

License GPL-2

Imports methods

NeedsCompilation no

Repository CRAN

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MCS-package *Model Confidence Set procedure*

Description

Perform the Model Confidence Set procedure of Hansen et.al (2011) for a given set of loss series belonging to several different models that should be compared

Details

Package:	MCS
Type:	Package
Version:	0.1.3
Date:	2014-07-27
License:	GPL-2

The R package MCS aims to implement the Model Confidence Set (MCS) procedure recently developed by Hansen et al. (2011). The Hansen's procedure consists on a sequence of tests which permits to construct a set of 'superior' models, where the null hypothesis of Equal Predictive Ability (EPA) is not rejected at a certain confidence level. The EPA statistic tests is calculated for an arbitrary loss function, meaning that we could test models on various aspects, for example punctual forecasts.

Author(s)

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References

Hansen PR, Lunde A, Nason JM (2011). The model confidence set. Econometrica, 79(2), 453-497. Bernardi M. and Catania L. (2014) The Model Confidence Set package for R. URL http://arxiv.org/abs/1410.8504

Examples

```
## Not run:
library(MCS)
data(Loss)
MCS <- MCSprocedure(Loss=Loss[,1:5],alpha=0.2,B=5000,statistic='Tmax',cl=NULL)

## End(Not run)
```

Loss — *Matrix of Value at Risk losses coming from 10 ARCH-type models*

Description

Matrix of Losses associated to a forecast series of 2000 observation of the VaR calculated at the 1 confidence level. This is a 2000*10 matrix, the losses are calculated using the Asymmetric Loss function of Gonzales et.al. (2004).

Usage

```
Loss
```

Format

a matrix object.

Author(s)

Leopoldo Catania, 2014-07-27

References

Gonzalez-Rivera G, Lee TH, Mishra S (2004). Forecasting volatility: A reality check based on option pricing, utility function, value-at-risk, and predictive likelihood." International Journal of Forecasting, 20(4), 629-645. ISSN 0169-2070. doi:http://dx.doi.org/10.1016/j.ijforecast.2003.10.003. URL http://www.sciencedirect.com/science/article/pii/S0169207003001420

LossLevel — *Loss Function for level forecasts*

Description

Calculate the losses associated with level forecasts

Usage

```
LossLevel(realized, evaluated, which = "SE")
```

Arguments

realized	a vector with the realizations of the interest object.
evaluated	a vector or a matrix of forecasts
which	The loss function to use. possible choices are: 'SE' that coincides with Square Error and AE that coincides with Absolute Error

Value

A matrix with the forecast losses

Author(s)

Leopoldo Catania & Mauro Bernardi

`LossVaR` *Loss Function for VaR forecasts*

Description

Calculate the losses associated with VaR forecasts.

Usage

```
LossVaR(realized, evaluated, which = 'asymmetricLoss', type = 'normal',
  delta = 25, tau)
```

Arguments

`realized`	a vector of returns realization
`evaluated`	a vector or a matrix of VaR forecasts
`which`	The chosen VaR loss function. Only `which = 'asymmetricLoss'` is available.
`type`	if `which = 'asymmetricLoss'` the type of the asymmetric loss function of Gonzalez-Riviera et.al. (2004). Possible choices are `type = 'normal'` which reports the quantile loss function used for example in Koenker and Bassett (1978) and `type = 'differentiable'` for the differentiable version of Gonzalez-Riviera et.al. (2004).
`delta`	if `type = 'differentiable'` the `delta` parameter controls the smoothness of the function.
`tau`	the VaR confidence level

Value

A matrix with the VaR losses

Author(s)

Leopoldo Catania & Mauro Bernardi

References

Koenker, R., Bassett, G. (1978). Regression quantiles. Econometrica, 46(1), 33-50.

Gonzalez-Rivera G, Lee TH, Mishra S (2004). Forecasting volatility: A reality check based on option pricing, utility function, value-at-risk, and predictive likelihood.' International Journal of Forecasting, 20(4), 629-645. ISSN 0169-2070. URL http://www.sciencedirect.com/science/article/pii/S0169207003001420.

`LossVol` *Loss Function for volatility forecasts*

Description

Calculate the losses associated with volatility (standard deviation) forecasts

Usage

```
LossVol(realized, evaluated, which = "SE1")
```

Arguments

`realized`	a vector with some realized volatility measure
`evaluated`	a vector or a matrix of volatility forecasts
`which`	The loss function to use. possible choices are: `'SE1'`,`'SE2'`,`'QLIKE'`,`'R2LOG'`,`'AE1'`,`'AE2'`, for further information see Bernardi and Catania (2014) or Hansen and Lunde (2005).

Value

A matrix with the forecast losses

Author(s)

Leopoldo Catania & Mauro Bernardi

References

Koenker, R., & Bassett, G. (1978). Regression quantiles. Econometrica, 46(1), 33-50.

Gonzalez-Rivera G, Lee TH, Mishra S (2004). Forecasting volatility: A reality check based on option pricing, utility function, value-at-risk, and predictive likelihood." International Journal of Forecasting, 20(4), 629-645. ISSN 0169-2070. URL http://www.sciencedirect.com/science/article/pii/S0169207003001420.

Hansen PR, Lunde A (2005). A forecast comparison of volatility models: does anything beat a GARCH(1,1)?" Journal of Applied Econometrics, 20(7), 873-889. ISSN 1099-1255. URL http://dx.doi.org/10.1002/jae.800.

Bernardi M. and Catania L. (2014) The Model Confidence Set package for R. URL http://arxiv.org/abs/1410.8504

MCSprocedure *MCSprocedure*

Description

Perform the Model Confidence Set procedure of Hansen et.al. (2011)

Usage

```
MCSprocedure(Loss, alpha = 0.15, B = 5000, cl = NULL,
                    ram.allocation = TRUE, statistic = "Tmax", k = NULL, min.k = 3,
                         verbose = TRUE)
```

Arguments

Loss	A matrix or something coercible to that (as.matrix) which contains the loss series per each competing model
alpha	a scalar in (0,1) indicating the confidence level of the tests
B	an integer indicating the number of bootstrapped samples used to construct the statistic test
cl	A cl object created by calling makecl from the parallel package. If it is not NULL, then this will be used for parallel processing (remember to stop the cl on completion)
ram.allocation	Default TRUE, only considered if cl in not NULL. Let the function decide how to allocate memory when cl are supplied ? Usefull when many models are available.
statistic	Possible choice are : Tmax and TR. See Hansen et.al. (2011) [pag. 465] and Bernardi M. and Catania L. (2014) for more information.
k	The number of block bootstrap length. If NULL (default) the block length is determined by the max number of significants parameters resulted after fitting an AR(p) process on all the Loss differences as suggested by Hansen et.al. (2011)
min.k	If k=NULL the minimum length of the the blocks, by default equal to 3
verbose	Information abount the MCS procedure should be printed ?

Value

A SSM object

Author(s)

Leopoldo Catania & Mauro Bernardi

References

Hansen PR, Lunde A, Nason JM (2011). The model confidence set. Econometrica, 79(2), 453-497.

Bernardi M. and Catania L. (2014) The Model Confidence Set package for R. URL http://arxiv.org/abs/1410.8504

Examples

```
## Not run:
library(MCS)
data(Loss)
MCS <- MCSprocedure(Loss=Loss[,1:5],alpha=0.2,B=5000,statistic='Tmax',cl=NULL)

## End(Not run)
```

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show,SSM-method *SSM-methods*

Description

SSM-methods

Usage

```
## S4 method for signature 'SSM'
show(object)
```

Arguments

object	a SSM object

SSM-class *SSM-class*

Description

Class for SSM object

`STOXXIndexesRet` *STOXX indexes logarithmic returns from 1992-01-02 to 2014-07-24*

Description

Daily logarithmic returns of the STOXX North America 600 (SXA1E) the STOXX Asia/Pacific 600 (SXP1E) the STOXX Europe 600 (SXXP) and the STOXX Global 1800 (SXW1E) from 1992-01-02 to 2014-07-24.

Usage

```
STOXXIndexesRet
```

Format

a `xts` object.

Author(s)

Leopoldo Catania, 2014-07-27

Source

www.stoxx.com

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