

Package ‘MCS’

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Type Package

Title Model Confidence Set Procedure

Version 0.1.3

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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](https://doi.org/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)

Leopoldo Catania & Mauro Bernardi

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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',c1=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 significant 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 about 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)
```

show,SSM-method	<i>SSM-methods</i>
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Description

SSM-methods

Usage

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

Arguments

object a SSM object

SSM-class	<i>SSM-class</i>
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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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