Package: MCS (via r-universe)

May 19, 2026

Type Package

Title Model Confidence Set Procedure

Version 0.2.0

Date 2026-03-19

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Depends R(>= 3.0.1)

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

License GPL-2

Encoding UTF-8

Imports methods

RoxygenNote 7.3.3

NeedsCompilation no

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Repository https://leopoldocatania.r-universe.dev

Date/Publication 2026-03-19 15:40:12 UTC

RemoteUrl https://github.com/cran/MCS

RemoteRef HEAD

RemoteSha b016aa7000192bd7f1de6c3b5daf0e2be97eb753

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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

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

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. doi:http://dx.doi.org/10.1016/j.ijforecast.2003.10.003. 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

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. doi:http://dx.doi.org/10.1016/j.ijforecast.2003.10.003. 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. doi:10.1002/jae.800. URL http://dx.doi.org/10.1002/jae.800.

Bernardi M. and Catania L. (2014) The Model Confidence Set package for R.

`MCSprocedure` *MCSprocedure*

Description

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

Usage

```
MCSprocedure(
  Loss,
  alpha = 0.15,
  B = 1000,
  statistic = "Tmax",
  k = NULL,
  min.k = 3,
  verbose = TRUE,
  seed = NULL
)
```

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

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 ?
seed	Fixed by set.seed(seed). If NULL, one random seed will be selected.

Value

A SSM object

Author(s)

Leopoldo Catania

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.

Examples

```
#set the seed
set.seed(123)
# DGP is iid standard normal draws
iT = 500
vY = rnorm(iT)
# Point predicitions from 11 competing modeld
# The best model is model6
mM = matrix(rep(seq(-0.5, 0.5, length.out = 11), iT), nrow = iT, byrow = TRUE)
# compute squared error loss
Loss = apply(mM, 2, LossLevel, realized = vY, which = "SE")
# compute the SSM
MCS = MCSprocedure(Loss, verbose = TRUE)
#print the results
MCS
```

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show,SSM-method *SSM-methods*

Description

SSM-methods

Usage

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

Arguments

object	An object of the class SSM

SSM-class *SSM-class*

Description

Class for SSM object

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