Package ‘changepointTests’

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Type Package
Title Change Point Tests for Joint Distributions and Copulas
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Description Change point tests for joint distributions and copulas using pseudo-observations with multipliers or bootstrap. The processes used here have been defined in Bucher, Kojadinovic, Rohmer & Segers <doi:10.1016/j.jmva.2014.07.012> and Nasri & Remillard <doi:10.1016/j.jmva.2019.03.002>.
License GPL-3
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Description

Pseudo-observations used in Nasri, Remillard, Bahraoui (2021). The values represent conditional cdfs of Gaussian HMM models applied to log-returns of Nasdaq and Dow Jones Industrial indexes from 2007 and 2008. If the models are correct, the pseudo-observations should be almost iid with uniform distribution.

Usage

data(pseudos)

Format

Pseudo-observations from Gaussian HMM models with 3 regimes for log-returns of the to Nasdaq index and Dow Jones Industrial indexes from 2007 and 2008.

- 1st column: pseudo-observations of a Gaussian HMM model with 3 regimes applied to the Nasdaq log-returns.
- 2nd column: pseudo-observations of a Gaussian HMM model with 3 regimes applied to the Dow Jones Industrial log-returns.

test.change.point  

Function to perform changepoint tests with multiplier bootstrap using the usual sequential process

Description


Usage

test.change.point(
  x,
  N = 1000,
  n_cores = 2,
  boot.method = "multipliers",
  est = FALSE
)
test.change.point.copula.BKRS

Arguments

x (n x d) matrix of data (observations or pseudo-observations, including residuals),
d>=1
N number of multipliers samples to compute the P-value
n_cores number of cores for parallel computing (default = 2)
boot.method bootstrapping method: 'multipliers' (default, fastest) or 'bootstrap'
est if TRUE, tau is estimated (default = FALSE)

Value

CVM Cramer-von Mises statistic
KS Kolmogorov-Smirnov statistic
pvalueCVM Pvalue for the Cramer-von Mises statistic
pvalueKS Pvalue for the Kolmogorov-Smirnov statistic
tauCVM Estimated changepoint using the Cramer-von Mises statistic
tauKS Estimated changepoint using the Kolmogorov-Smirnov statistic

Author(s)

Bouchra R Nasri and Bruno N Remillard, August 6, 2020

References


Examples

x=matrix(rnorm(600),ncol=3)
out = test.change.point(x)

description

This function compute the Cramer-von Mises and Kolmogorov-Smirnov test statistics based on the new sequential process of Bucher et al (2014), using multipliers and parallel computing. Two methods of bootstrapping are used: non-sequential (fastest) and sequential. Both methods yields basically the same P-values.
Usage

test.change.point.copula.BKRS(
  x,
  N = 1000,
  n_cores = 2,
  method = "nonseq",
  est = FALSE
)

Arguments

x
(n x d) matrix of data (observations or pseudo-observations, including residuals),
d >=2

N
number of multipliers samples to compute the P-value

n_cores
number of cores for parallel computing (default = 2)

method
'nonseq' (default) or 'seq'

est
if TRUE, tau is estimated (default = FALSE)

Value

CVM
Cramer-von Mises statistic

KS
Kolmogorov-Smirnov statistic

pvalueCVM
Pvalue for the Cramer-von Mises statistic

pvalueKS
Pvalue for the Kolmogorov-Smirnov statistic

tauCVM
Estimated changepoint using the Cramer-von Mises statistic

tauKS
Estimated changepoint using the Kolmogorov-Smirnov statistic

Author(s)

Bouchra R Nasri and Bruno N Remillard, August 6, 2020

References

series using pseudo-observations

Bucher, A., Kojadinovic, I., Rohmer, T., & Segers, J. (2014). Detecting changes in cross-sectional 

Examples

x<-matrix(rnorm(100),ncol=2)
out = test.change.point.copula.BKRS(x)
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