Package ‘TwoCop’

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Type Package
Title Nonparametric test of equality between two copulas
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Description This package implements the nonparametric test of equality between two copulas proposed by Remillard and Scaillet in their 2009 JMVA paper.
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R topics documented:

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Description

This package implements the nonparametric test of equality between two copulas proposed by Remillard and Scaillet (2009) in their JMVA paper. The test is based on the Cramer-von-Mises statistic between the two empirical copulas. An approximate p-value is returned.

Details
The function `TwoCop` provides an approximate p-value for the test of equality between two copulas.

**Author(s)**

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**References**


**Description**

This function performs the nonparametric test of equality between two copulas proposed by Remillard and Scaillet (2009). The test is based on the Cramer-von-Mises statistic between the two empirical copulas. An approximate p-value is returned.

**Usage**

```r
TwoCop(x, y, Nsim=100, paired=FALSE, alpha=0.95)
```

**Arguments**

- `x`: `n` by `d` matrix containing the first dataset.
- `y`: `m` by `d` matrix containing the second dataset.
- `Nsim`: Number of iterations used in the approximation of the p-value.
- `paired`: `FALSE` (default) means that `x` and `y` are from two independent populations, `TRUE` indicates paired data.
- `alpha`: Level of the calculated VaR. Default is 0.95.

**Details**

Details of the method can be found in Remillard and Scaillet (2009).
Value

A list of the following objects:

- pvalue: p-value based on the multiplier Monte Carlo method with \( \text{nsim} \) iterations.
- cvmsim: Simulated values of the Cramer-von Mises statistic.
- VaR: \( \alpha \) quantile of the simulated Cramer-von Mises statistics.

Author(s)

Bruno Remillard and Jean-Francois Plante

References


Examples

# Simulating a bivariate normal (copula = independence)

\[
X = \text{matrix}(\text{rnorm}(100), \text{ncol}=2)
\]

# Simulating a bivariate exponential distribution with a Clayton copula

\[
v = \text{runif}(50)
\theta = 1
x = (1/\text{runif}(50))^{\text{theta+1}}
\]

\[
u = -(x^\theta - v^\theta + 1)^{-1/\theta}
\]

\[
y = \text{cbind}(-\log(1-u), -\log(1-v))
\]

# Testing equality of the copulas

\[
\text{TwoCop}(X, Y) \text{\$pvalue}
\]
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