Package 'ECGofTestDx'

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Type Package

Title A Goodness-of-Fit Test for Elliptical Distributions with Diagnostic Capabilities

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Depends R (>= 3.3.0), orthopolynom, bootstrap

Description A goodness-of-fit test for elliptical distributions with diagnostic capabilities. Gilles R. Ducharme, Pierre Lafaye de Micheaux (2019) <arXiv:1902.03622>.

License GPL (>= 2)

NeedsCompilation yes

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R topics documented:

| SmoothECTest | *Smooth Goodness-of-fit Test for Multivariate Elliptical Distributions* |

Description

Smooth tests of goodness-of-fit for multivariate elliptical distributions with diagnostic (Dx) capabilities and full invariance to affine-linear transformations. By increasing the value of the hyperparameter K, the test and the Dx become adaptively consistent against an increasing number of departures from the null model. The Dx pertains to elements R and U of the Cambanis, Huang & Simons stochastic representation of elliptical data. Note that p-values can be computed via an asymptotic chi-square approximation or by Monte Carlo.

Usage

```
SmoothECTest(data, K = 7, family = "MVN", Est.Choice = "", Cpp = TRUE)
```

Arguments

data	The data set to use. Cases with missing values are removed.
K	Integer. Hyperparameter controlling the size of the embedding family. Should be greater than or equal to 3 for the Multivariate Normal Distribution. The computation time increases with the size of the data frame and K . Please be patient.
family	The only family available in the current version of the package is the Multivariate Normal Distribution.
Est.Choice	Not used yet. Maximum Likelihood Estimation (MLE) or Method of moments. Currently, only the MLE is implemented.
Cpp	Logical. If TRUE, the faster C++ code is used.

Value

List with components:

Q	The global test statistic with hyperparameter K.
dfQ	Degrees of freedom of the asymptotic chi-square approximation.
pval.asymp.Q	Asymptotic p-value for Q.
Uscaled	Scaled component $U(s)_K$ tests the uniformity of element U.
dfU	Degrees of freedom of the asymptotic chi-square approximation.
pval.asymp.U	Asymptotic p-value for Uscaled.
Iscaled	Scaled component $I(s)_K$ tests the correlation between R and U.
dfI	Degrees of freedom of the asymptotic chi-square approximation.
pval.asymp.I	Asymptotic p-value for Iscaled.
Rscaled	Scaled component $R(s)_K$ test the distribution of element R, radius of the data.
dfR	Degrees of freedom of the asymptotic chi-square approximation.
pval.asymp.R	Asymptotic p-value for Rscaled.

Author(s)

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References

Gilles R. Ducharme, Pierre Lafaye de Micheaux (2019). A Goodness-of-fit Test for Elliptical Distributions with Diagnostic Capabilities. ArXiv pre-print. https://arxiv.org/abs/1902.03622

Examples

```
# The famous (Fisher's or Anderson's) iris data set
# Increase the value of K to K = 7 for better results.
 ressetosa <- SmoothECTest(iris[1:50, -5], K = 3)
 ressetosa

# Examination marks (n = 88) in Vectors, Algebra and Statistics from the "Open
# book-Closed book examination" data set (Mardia, Kent and Bibby, 1979,
# p. 3-4).
# Increase the value of K to K = 5 for better results.
 data <- scor[, c(2, 3, 5)]
 result <- SmoothECTest(data, K = 3)
 result
```

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