Package ‘covTestR’

August 17, 2018

Type     Package
Title    Covariance Matrix Tests
Version  0.1.4
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Description Testing functions for Covariance Matrices. These tests include high-
dimension homogeneity of covariance
matrix testing described by Schott (2007) <doi:10.1016/j.csda.2007.03.004> and high-
dimensional one-sample tests of
covariance matrix structure de-
tests use C++ to speed performance and allow larger data sets.
License GPL-2
LazyData TRUE
RoxygenNote 6.1.0
URL https://covtestr.bearstatistics.com
BugReports https://github.com/BenBarnard/covTestR/issues
Depends R (>= 3.3)
Imports rlang, purrr, Rcpp
LinkingTo Rcpp, RcppArmadillo
SystemRequirements C++11
NeedsCompilation yes
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Repository CRAN
Date/Publication 2018-08-17 21:10:03 UTC
R topics documented:

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 covTestR-package        Covariance Matrix Testing Functions

Description

Testing functions for Covariance Matrices. These tests include high-dimension homogeneity of covariance matrix testing described by Schott (2007) 10.1016/j.csda.2007.03.004 and high-dimensional one-sample tests of covariance matrix structure described by Fisher, et al. (2010) 10.1016/j.jmva.2010.07.004. Covariance matrix tests use C++ to speed performance and allow larger data sets.

Ahmad2015

Tests for Structure of Covariance Matrices

Description

Performs Tests for the structure of covariance matrices.

Usage

Ahmad2015(x, Sigma = "identity", ...)

Chen2010(x, Sigma = "identity", ...)

Fisher2012(x, Sigma = "identity", ...)

LedoitWolf2002(x, Sigma = "identity", ...)

Nagao1973(x, Sigma = "identity", ...)

Srivastava2005(x, Sigma = "identity", ...)

Srivastava2011(x, Sigma = "identity", ...)

Arguments

- `x` data as a list of matrices
- `Sigma` Population covariance matrix as a matrix
- `...` other options passed to `covTest` method

Value

A list with class "htest" containing the following components:

- `statistic` the value of equality of covariance test statistic
- `parameter` the degrees of freedom for the chi-squared statistic
- `p.value` the p-value for the test
- `estimate` the estimated covariances if less than 5 dimensions
- `null.value` the specified hypothesized value of the covariance difference
- `alternative` a character string describing the alternative hypothesis
- `method` a character string indicating what type of equality of covariance test was performed
- `data.name` a character string giving the names of the data

References


See Also

Other Testing for Structure of Covariance Matrices: `structureCovariances`

Examples

```r
chen2010(as.matrix(iris[1:50, 1:3]))
```

Description

Performs tests for homogeneity of 2 and k covariance matrices.

Usage

```r
Ahmad2017(x, ...)
BoxesM(x, ...)
Chaipitak2013(x, ...)
Ishii2016(x, ...)
Schott2001(x, ...)
Schott2007(x, ...)
Srivastava2007(x, ...)
Srivastava2014(x, ...)
SrivastavaYanagihara2010(x, ...)
```

Arguments

- **x**: data as a list of matrices
- **...**: other options passed to covTest method

Value

A list with class "htest" containing the following components:

- **statistic**: the value of homogeneity of covariance test statistic
- **parameter**: the degrees of freedom for the chi-squared statistic
p.value the p-value for the test

estimate the estimated covariances if less than 5 dimensions

null.value the specified hypothesized value of the covariance difference

alternative a character string describing the alternative hypothesis

method a character string indicating what type of homogeneity of covariance test was performed

data.name a character string giving the names of the data

References


Schott, J. (2007). A test for the equality of covariance matrices when the dimension is large relative to the sample sizes. Computational Statistics & Data Analysis, 51(12):6535-6542. 10.1016/j.csda.2007.03.004

Srivastava, M. S. (2007). Testing the equality of two covariance matrices and independence of two sub-vectors with fewer observations than the dimension. InInternational Conference on Advances in Interdisciplinary Statistics and Combinatorics, University of North Carolina at Greensboro, NC, USA.


See Also

Other Testing for Homogeneity of Covariance Matrices: homogeneityCovariances

Examples

irisSpecies <- unique(iris$Species)

iris_ls <- lapply(irisSpecies,
  function(x){as.matrix(iris[iris$Species == x, 1:4])})
names(iris_lsI) <- irisSpecies
Ahmad2017(iris_lsI)

homogeneityCovariances

*Test Wrapper for Homogeneity of Covariance Matrices*

**Description**

Performs 2 and k sample homogeneity of covariance matrices test using test, `covTest`.

**Usage**

```r
homogeneityCovariances(x, ..., covTest = BoxesM)
```

**Arguments**

- `x` data as a data frame, list of matrices, grouped data frame, or resample object
- `...` other options passed to covTest method
- `covTest` homogeneity of covariance matrices test method

**Details**

The `homogeneityCovariances` function is a wrapper function that formats the data for the specific covTest functions.

**Value**

A list with class "htest" containing the following components:

- `statistic` the value of homogeneity of covariance test statistic
- `parameter` the degrees of freedom for the chi-squared statistic
- `p.value` the p-value for the test
- `estimate` the estimated covariances if less than 5 dimensions
- `null.value` the specified hypothesized value of the covariance difference
- `alternative` a character string describing the alternative hypothesis
- `method` a character string indicating what type of homogeneity of covariance test was performed
- `data.name` a character string giving the names of the data
structureCovariances

See Also
Other Testing for Homogeneity of Covariance Matrices: Ahmad2017

Examples
homogeneityCovariances(iris, group = Species)

structureCovariances  Test Wrapper for Structure of a Covariance Matrices

Description
Performs a structure of a covariance matrix test.

Usage
structureCovariances(x, Sigma = "identity", ..., covTest = Nagao1973)

Arguments
x  data
Sigma  Population covariance matrix
...  other options passed to covTest method
covTest  structure of covariance matrix test method

Details
The structureCovariances function is a wrapper function that formats the data for the specific covTest functions.

Value
A list with class "htest" containing the following components:

- statistic  the value of equality of covariance test statistic
- parameter  the degrees of freedom for the chi-squared statistic
- p.value  the p-value for the test
- estimate  the estimated covariances if less than 5 dimensions
- null.value  the specified hypothesized value of the covariance difference
- alternative  a character string describing the alternative hypothesis
- method  a character string indicating what type of equality of covariance test was performed
- data.name  a character string giving the names of the data
See Also

Other Testing for Structure of Covariance Matrices: Ahmad2015
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