

Package ‘pecora’

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Title Permutation Conditional Random Tests
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Description It provides functions to perform permutation conditional random one-sample and two-samples t-tests in a multivariate framework.
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pecora-package

pecora-package

Description

The library is devoted to permutation-based inferential methods.

The pecora (permutation conditional random) package provides functions to perform the one-sample and two-samples t-tests using permutations/sign-flipping.

The tests comprised are: the one and two samples t-tests.

Author(s)

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References

For the general framework of univariate and multivariate permutation tests see: Pesarin, F. (2001) Multivariate Permutation Tests with Applications in Biostatistics. Wiley, New York.

Examples

```
X <- matrix(rnorm(100*20), nrow=20)
out <- oneSample(X = X)
pv <- t2p(Test = out, alternative = "two.sided")
```

```
X <- matrix(rnorm(100*20), nrow=20)
rownames(X) <- c(rep(0, 10), rep(1,10))
out<- twoSamples(X = X)
pv <- t2p(Test = out, alternative = "two.sided")
```

oneSample

Permutatation-based one sample t-test

Description

Performs sign-flipped one-sample t-tests.

Usage

```
oneSample(X, B = 1000, seed = 1234, permReturn = TRUE)
```

Arguments

<code>X</code>	data matrix where columns represent the m variables and rows the n observations.
<code>B</code>	numeric value, number of permutations to be performed, including the identity. Default is 1000.
<code>seed</code>	numeric value, specify seed. Default is 1234.
<code>permReturn</code>	logical value, TRUE to return the t-tests permutation distribution. Default is TRUE.

Value

Returns an object matrix:

tv Matrix with dimensions $m \times B$ of permuted one-sample t-tests. The first column is the observed one-sample t-tests.

if `permReturn = TRUE` otherwise returns:

tv Vector of m observed one-sample t-tests

Author(s)

Angela Andreella

Examples

```
X <- matrix(rnorm(100*20), nrow=20)
out <- oneSample(X = X)
```

t2p	<i>From t-tests to p-values</i>
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Description

Use permutation distribution of a test statistic to get p-values.

Usage

```
t2p(Test, alternative = "two.sided", rankBased = TRUE, permReturn = TRUE, df = Inf)
```

Arguments

<code>Test</code>	can be a matrix or a vector. In the first case the columns represent the B permutations and rows the m tests statistic. The observed test statistic is in the first column and the permutation distribution in the remaining columns. In the second case, it is a vector of length m of observed tests statistics. If <code>rankBased = TRUE</code> , you must provide the first option (matrix of permuted statistical tests).
<code>alternative</code>	character string referring to the alternative hypothesis ("greater", "lower", or "two.sided"). is "two.sided".

rankBased	logical value, TRUE to compute p-values by permutation distribution. Default @TRUE.
permReturn	logical value, TRUE to return the t-tests and p-values permutation distribution. Default @TRUE.
df	numerical value. Degrees of freedom (> 0 , maybe non-integer). Default df = Inf

Value

Returns an object matrix:

pv Matrix with dimensions $m \times B$ of permuted one-sample p-values. The first column is the p-values for the observed one-sample t-tests.

if permReturn = TRUE otherwise returns:

pv Vector of m p-values for the observed one-sample t-tests

Author(s)

Angela Andreella

Examples

```
X <- matrix(rnorm(100*20), nrow=20)
out <- oneSample(X = X)
pv <- t2p(Test = out)
```

twoSamples	<i>Permutatation-based two sample t-test</i>
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Description

Performs two-sample t-tests by permutations.

Usage

```
twoSamples(X, B = 1000, seed = 1234,
permReturn = TRUE, label = NULL)
```

Arguments

X	data matrix where columns represent the m variables and rows the n observations. The columns' name defines the groups' label.
B	numeric value, number of permutations to be performed, including the identity. Default is 1000.
seed	numeric value, specify seed. Default is 1234.

permReturn	logical value, TRUE to return the t-tests and p-values permutation distribution. Default is TRUE.
label	by default label = NULL. Labels of the observations, if NULL the rows's name are considered. D

Value

Returns a matrix objects:

Test Matrix with dimensions $m \times B$ of permuted two-samples t-tests. The first column is the observed one-sample t-tests.

if permReturn = TRUE otherwise returns:

Test Vector of m observed two-samples t-tests

Author(s)

Angela Andreella

Examples

```
X <- matrix(rnorm(100*20), nrow=20)
rownames(X) <- c(rep(0, 10), rep(1,10))
out<- twoSamples(X = X)
```

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