Package ‘pecora’

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Type Package

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.

License GPL (>= 2)

Imports Rcpp (>= 1.0.3), matrixStats, stats

LinkingTo Rcpp, RcppArmadillo

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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

`X`	data matrix where columns represent the `m` variables and rows the `n` observations.
`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 permutation distribution. Default is `TRUE`.

Value

Returns an object matrix:

tv Matrix with dimensions mxB 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` *From t-tests to p-values*

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

`Test`	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 `rankBased = TRUE`, you must provide the first option (matrix of permuted statistical tests).
`alternative`	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 mxB 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` *Permutatation-based two sample t-test*

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 mxB 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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