Package 'gTestsPair'

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Title New Nonparametric Tests for Multivariate Paired Data and Pair Matching

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Depends R (>= 3.5.0)

Imports ade4

Description Implements three nonparametric two-sample tests for multivariate paired data and pair matching. Methods are described in the associated preprint: <doi:10.48550/arXiv.2007.01497>.

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NeedsCompilation no

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Contents

data_pair *A matrix representing observations in pair*

Description

This is a n by 2p matrix, where n is the number of pairs and p is the dimension of observations. For each row, the first p columns represent the observation from sample 1, and the second p columns represent the paired observation from sample 2. The data is generated from a paired design with mean shift.

g.tests_pair *New Non-parametric Tests for Multivariate Paired Data and Pair Matching*

Description

This function provides three non-parametric two-sample tests for paired data and pair matching.

Usage

```
g.tests_pair(E, n, test.type = "all", perm = 0)
```

Arguments

E	An edge matrix representing a similarity graph on all observations with the number of edges in the similarity graph being the number of rows and 2 columns. Each row records the indices of the two ends of an edge in the similarity graph.
n	The number of pairs.
test.type	The default value is "all", which means all three tests, the orignial edge-count test, the scaled edge-count test, and the generalized edge-count test, are performed. Set this value to "original" or "o" to perform only the original edge-count test; set this value to "scaled" or "s" to perform only the scaled edge-count test; set this value to "generalized" or "g" to perform only the generalized edge-count test.
perm	The number of permutations performed to calculate the p-value of the test. The default value is 0, which means the permutation is not performed and only the approximate p-value based on asymptotic theory is provided. Doing permutation could be time consuming, so be cautious if you want to set this value to be larger than 10,000.

Value

test.statistic	The value of the test statistic.
pval.approx	The approximated p-value based on asymptotic theory.
pval.perm	The permutation p-value when the argument ‘perm‘ is positive.

References

Zhang J., Chen H., and Zhou XH. A new non-parametric test for multivariate paired data from pair matching or paired designs.

Examples

```
# The "example_pair" data contains the paired data 'data_pair'.
# It is a n by 2p matrix with n being the number of pairs and p being the dimension of
# observations.
# For each row, the first p columns represent the observation from sample 1, and the
# second p columns represent the paired observation from sample 2.
# The data is generated from a paired design with mean shift.
    data(example_pair)
    n = nrow(data_pair)
    p = ncol(data_pair)/2
    k = 5
    data1 = data_pair[,1:p]
    data2 = data_pair[,(p+1):(2*p)]
    case = rbind(data1,data2)
    dist1 = as.matrix(dist(case))
    library("ade4")
    E = mstree(as.dist(dist1),k)
    g.tests_pair(E,n)

# Get permutation p-value with 300 permutations.
    g.tests_pair(E, n, perm = 300)
```

---

getMV_pair *Get intermediate results for g.tests_pair function*

Description

This function calculates means and variances of R1 and R2 quantities under the paired- comparison permutation null.

Usage

```
getMV_pair(E,n)
```

Arguments

E	An edge matrix representing a similarity graph on all observations with the number of edges in the similarity graph being the number of rows and 2 columns. Each row records the indices of the two ends of an edge in the similarity graph.
n	The number of pairs.

See Also

g.tests_pair

getR1R2_pair *Get intermediate results for g.tests_pair function*

Description

This function calculates R1 and R2 quantities.

Usage

```
getR1R2_pair(E,group1)
```

Arguments

E	An edge matrix representing a similarity graph on all observations with the number of edges in the similarity graph being the number of rows and 2 columns. Each row records the indices of the two ends of an edge in the similarity graph.
group1	The indices of observations in the sample 1.

See Also

g.tests_pair

gTestsPair *New Non-parametric Tests for Multivariate Paired Data and Pair Matching*

Description

This package includes three non-parametric two-sample tests for paired data and pair matching.

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References

Zhang J., Chen H., and Zhou XH. A new non-parametric test for multivariate paired data from pair matching or paired designs.

See Also

g.tests_pair

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