Package 'permChacko'

September 18, 2024

Title Chacko Test for Order-Restriction with Permutation

Version 1.0.1

Date 2024-09-18

Description Implements an extension of the Chacko chi-square test for ordered vectors (Chacko, 1966, <https://www.jstor.org/stable/25051572>). Our extension brings the Chacko test to the computer age by implementing a permutation test to offer a numeric estimate of the p-value, which is particularly useful when the analytic solution is not available.

License GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.3.2

Imports methods

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

Config/testthat/edition 3

URL https://ocbe-uio.github.io/permChacko/

BugReports https://github.com/ocbe-uio/permChacko/issues

VignetteBuilder knitr

NeedsCompilation no

Author Waldir Leoncio [aut, cre] (<https://orcid.org/0000-0002-6719-6162>), Graeme Ruxton [aut], Morten Wang Fagerland [aut]

Maintainer Waldir Leoncio <w.l.netto@medisin.uio.no>

Repository CRAN

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Contents

`.onAttach` *Prints welcome message on package attachment*

Description

Prints package version number and welcome message on package load

Usage

```
.onAttach(libname, pkgname)
```

Arguments

`libname`	library location. See `?base::.onAttach` for details
`pkgname`	package name. See `?base::.onAttach` for details

`chacko63_tab1` *Table I*

Description

Table of $p_{m,k}$. Gives the values of $p_{m,k}$ for equal sample sizes and $k = 3, 4, \ldots, 10$.

Usage

```
chacko63_tab1
```

Format

An object of class `matrix` (inherits from `array`) with 10 rows and 8 columns.

References

Chacko, V. J. (1963). Testing homogeneity against ordered alternatives. The Annals of Mathematical Statistics, 945-956.

chacko66_sec3 *Chacko (1966), section 3*

Description

A multinomial example with 5 cell frequencies

Usage

```
chacko66_sec3
```

Format

An object of class `integer` of length 5.

References

Chacko, V. J. (1966). Modified chi-square test for ordered alternatives. Sankhyā: The Indian Journal of Statistics, Series B, 185-190.

chacko66_sec5 *Chacko (1966), section 5*

Description

A plate with the humidity values continuously decreasing was divided into 10 equal parts and 20 termites introduced on each part. The number of termites counted as a specified time interval on each of the 10 parts of the plate are shown in the dataset

Usage

```
chacko66_sec5
```

Format

An object of class `integer` of length 10.

References

Chacko, V. J. (1966). Modified chi-square test for ordered alternatives. Sankhyā: The Indian Journal of Statistics, Series B, 185-190.

permChacko *The Chacko test for order-restriction with permutation test*

Description

The Chacko test for order-restriction with permutation test

Usage

```
permChacko(x, n_perm = 1000L, verbosity = 0)
```

Arguments

x	vector of numeric values
n_perm	number of permutations to calculate the p-value numerically
verbosity	if TRUE, prints intermediate messages and output

Value

A list containing the test statistic, p-values (analytic, numeric and tabular, when available), the number of permutations performed, the original data and the reduced data. Use `names()` and `str()` on the output for more details.

References

Chacko, V. J. (1963). Testing homogeneity against ordered alternatives. The Annals of Mathematical Statistics, 945-956.

Chacko, V. J. (1966). Modified chi-square test for ordered alternatives. Sankhyā: The Indian Journal of Statistics, Series B, 185-190.

Examples

```
ruxton221207 <- c(6, 8, 4, 7, 3)
chacko66_sec3 <- c(10L, 16L, 14L, 12L, 18L)
chacko66_sec5 <- c(12L, 14L, 18L, 16L, 22L, 20L, 18L, 24L, 26L, 30L)

permChacko(ruxton221207)
permChacko(chacko66_sec3)
permChacko(chacko66_sec5)
```

reduceVector *Reduce a vector using the ordering process*

Description

This function implements the ordering process described in Chacko (1963) and Chacko (1966).

Usage

```
reduceVector(x, verbosity = 0L)
```

Arguments

x	a vector of numeric values
verbosity	a natural number indicating the amount of output to print

Value

A list containing the original vector, the reduced vector, their weights and the number of reductions performed. Use `names()` and `str()` on the output for more details.

Author(s)

Waldir Leoncio

Examples

```
reduceVector(c(10, 16, 14, 12, 18))
reduceVector(c(10, 8, 4, 2, 1))
reduceVector(chacko66_sec3)
reduceVector(chacko66_sec5)
reduceVector(chacko66_sec5, verbosity = 1)
```

ruxton221207 *Example by Graeme Ruxton*

Description

A simple example showing how a vector can be reduced to one element.

Usage

```
ruxton221207
```

Format

An object of class `numeric` of length 5.

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