Package ‘IncomPair’

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Type Package

Title Comparison of Means for the Incomplete Paired Data

Version 0.1.0

Description Implements a variety of nonparametric and parametric methods that are commonly used when the data set is a mixture of paired observations and independent samples. The package also calculates and returns values of different tests with their corresponding p-values.


Ekbohm, G. (1976) <doi:10.1093/biomet/63.2.299> "On comparing means in the paired case with incomplete data on both responses".


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Description

A total of 30 different coyotes were used for the study. One of the methods was the QIAGEN DNeasy Blood and Tissue Kit and the other was the more traditional chloroform isoamyl alcohol method. Selected randomly, 6 of these coyotes were measured using both methods; 8 were measured with the kit method only and the remaining 16 were measured with chloroform method only.

Usage

DNA

Format

The data frame has 30 rows and 2 variables:

- **kit** DNA measured with the kit method, in ng/uL
- **chloroform** DNA measured with the chloroform method, in ng/uL

Source

IncomPair  

**IncomPair: Comparison of Means for the Incomplete Paired Data**

**Description**

The package contains three functions and two data sets. The functions perform testing the hypothesis of equality of means for the incomplete pairs setting data, including permb, parmb and rankb. Permb implements two different nonparametric tests based on a permutation test; rankb uses a rank-based procedures; and parmb uses different test statistics which are parametric in nature.

**Details**

For a complete list, use help(package="IncomPair")

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### parmb

**Parametric Based Tests for Incomplete Paired Data**

**Description**

The function performs testing the Hypothesis of equality of means for the incomplete pairs setting data. The function uses six test statistics that were proposed for testing the equality of the means of a bivariate normal distribution with unknown common variance and correlation coefficient when observations are missing on both variates. These function includes Lin and Stivers (1974, Ts), Bhoj (1989, pp. 282, Z), Bhoj (1989, pp. 282, Zb), Bhoj (1989, pp. 283, T), Bhoj (1989, pp. 283, Zh) and Bhoj (1989, pp 284, Zls). For more details, information of the functions see Bhoj (1989).

**Usage**

```
parmb(xp, yp, xu, yu, r, mu = NULL, method = "Zb",
      alternative = "two.sided", verbose = TRUE)
```

**Arguments**

- `xp, yp`: (non-empty) numeric vectors of data values of the the complete pairs
- `xu`: a numeric vector of data on x only
- `yu`: a numeric vector of data on y only
- `r`: a number indicating the correlation between the complete pairs
- `mu`: a number indicating the true value of the mean (or difference in means if you are performing a two sample test)
method  a character string specifying the different type of methods, must be one of "Zb" 
(default), "Zb", "T", "Tls", "Zls", "Zh"
alternative a character string specifying the alternative hypothesis, must be one of "two.sided" 
(default), "greater" or "less"
verbose if TRUE, show the test statistic used, null and alternative hypotheses in addition 
to the p-value

Value

A S4 object containing the following components:

Title a character string describing the test statistic used
Nhypothesis a character string describing the null hypothesis
Ahypothesis a character string describing the alternative hypothesis
Pval the p-value for the test

References

2 Ekbohm, G. (1976). On comparing means in the paired case with incomplete data on both re-
sponses. Biometrika 63(2), 299-304.

Examples

n=20
n1=15
n2=10
r=0.8
xp=rnorm(n)
yp=r*xp+(1-r)*(rnorm(n))
xu=rnorm(n1)
yu=rnorm(n2)
mu=0
parmb(xp,yp,xu,yu,r,mu,method="Zb",alternative="two.sided")

permb  Permutation Based Tests for Incomplete Paired Data

Description

The function performs testing the hypothesis of equality of means for the incomplete pairs setting 
data. The function combines the observed mean difference for the complete pairs with the difference 
between the two means of the independent samples. The function implements two different non-
parametric tests based on permutation tests that were proposed by Einsporn and Habtzghi (2013), 
and Maritz (1995). The two methods are denoted by EH and Maritz, respectively.
**Usage**

```r
cperm(xp, yp, xu, yu, r, mu = NULL, method = "EH", alternative = "two.sided", verbose = TRUE)
```

**Arguments**

- `xp`, `yp`: (non-empty) numeric vectors of data values of the complete pairs
- `xu`: a numeric vector of data on `x` only
- `yu`: a numeric vector of data on `y` only
- `r`: a number indicating the correlation between the complete pairs
- `mu`: a number indicating the true value of the mean (or difference in means if you are performing a two-sample test)
- `method`: a character string specifying the different type of methods, must be one of "EH" (default) or "Maritz"
- `alternative`: a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less"
- `verbose`: if TRUE, show the test used, null and alternative hypotheses in addition to the p-value

**Value**

A S4 object containing the following components:

- `Title`: a character string describing the test used
- `Nhypothesis`: a character string describing the null hypothesis
- `Ahypothesis`: a character string describing the alternative hypothesis
- `Pval`: the p-value for the test

**References**


**Examples**

```r
n=20
n1=15
n2=10
r=0.8
xp=rnorm(n)
yp=r*xp+(1-r)*(rnorm(n))
```
\begin{verbatim}
xu=rnorm(n1)
yu=rnorm(n2)
mu=0
permb(xp,yp,xu,yu,r,mu,method="Maritz",alternative="two.sided")
\end{verbatim}

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**race**

*5K Race Data*

**Description**

Runner’s time for 2 local 5K races in Northeast Ohio (Kent State University 5K race and Tallmadge Memorial 5K) were recorded. There were 32 runners who competed in both of these races, 478 who competed in only the Kent race, and 541 who competed in only the Tallmadge race in 2011.

**Usage**

\begin{verbatim}
race
\end{verbatim}

**Format**

The data frame has 1051 observations and 2 variables:

- **Kent** runner’s time completing the Kent course, in seconds
- **Tallmadge** runner’s time completing the Tallmadge course, in seconds

**Source**

3 https://www.kent.edu/RunTheWorld/past-races

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**rankb**

*Rank Based Tests for Incomplete Paired Data*

**Description**

The function performs testing the hypothesis of equality of means for the incomplete pairs setting data. The function uses a rank-based procedure for parameter estimation and hypothesis testing when the data are a mixture of paired observations and independent samples. The rank-based methods combine Wilcoxon signed-rank statistics and Wilcoxon-Mann-Whitney two-sample procedures. These methods were developed by Dubnicka, Blair and Hettmansperger (2002).

**Usage**

\begin{verbatim}
rankb(xp, yp, xu, yu, mu = NULL, method = "Ranku",
     alternative = "two.sided", verbose = TRUE)
\end{verbatim}
Arguments

- **xp, yp** (non-empty) numeric vectors of data values of the complete pairs
- **xu** a numeric vector of data on x only
- **yu** a numeric vector of data on y only
- **mu** a number indicating the true value of the mean (or difference in means if you are performing a two sample test)
- **method** a character string specifying the different type of methods, must be one of "Ranku" or "Rankw"
- **alternative** a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less"
- **verbose** if TRUE, show the test used, null and alternative hypotheses in addition to the p-value

Value

A S4 object containing the following components:

- **Title** a character string describing the test used
- **Nhypothesis** a character string describing the null hypothesis
- **Ahypothesis** a character string describing the alternative hypothesis
- **Pval** the p-value for the test

References


Examples

```r
n=20
n1=15
n2=10
r=0.8
xp=rnorm(n)
yp=r*xp+(1-r)*rnorm(n)
xu=rnorm(n1)
yu=rnorm(n2)
mu=0
rankb(xp,yp,xu,yu,mu,method="Rankw",alternative="two.sided")
```
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