Package ‘corTest’
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Type Package
Title Robust Tests for Equal Correlation
Version 0.9.8
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Description There are 6 novel robust tests for equal correlation. They are all based on logistic regres-
sions. U are proportion to different types of correlation in 6 methods. The ST1() is based on Pear-
son correlation. ST2() improved ST1() by using median absolute deviation. ST3() uti-
lized type M correlation and ST4() used Spearman correlation. ST5() and ST6() used two differ-
ent ways to combine ST3() and ST4(). We highly recommend ST5() according to the pas-
sage New Statistical Methods for Constructing Robust Differential Correlation Networks to char-
acterize the interactions among microRNAs published in Scientific Reports.
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R topics documented:

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fischer_transfer_test

Test for equal correlation

Description
Compute p-value with Fisher’s Z-transformation test. If biasCorrection is true, the corrected correlation is used. The formula is rho.corrected = rho - rho/(2*sqrt(n-1)).

Usage
fischer_transfer_test(x1,z1,x0,z0,biasCorrection=TRUE)

Arguments
- x1: a numeric vector
- z1: a numeric vector
- x0: a numeric vector
- z0: a numeric vector
- biasCorrection: a boolean value

Value
p-value of test

Author(s)
Danyang Yu <danyangyu@hnu.edu.cn>, Weiliang Qiu <stwxq@channing.harvard.edu>

References

Examples
x1=ghdist(n=100,g=0.2,h=0.2)
x0=ghdist(n=100,g=0.2,h=0.2)
z1=x1+ghdist(n=100,g=0.2,h=0.2)
z0=x0+ghdist(n=100,g=0.2,h=0.2)
p=fischer_transfer_test(x1,z1,x0,z0)
print(p)
ghdist

**Description**

Generating variables from g-and-h distribution

**Usage**

```r
ghdist(n, g=0, h=0)
```

**Arguments**

- n: the number of the variables you want to generate
- g: the parameter g of g-and-h distribution
- h: the parameter h of g-and-h distribution

**Value**

n variables generated from g-and-h distribution

**Examples**

```r
x <- ghdist(50, 0.2, 0.2)
p <- print(x)
```

---

st1

**Description**

Compute p-value for the equal correlation test with Pearson correlation based on a logistic regression model corresponding to two independent groups

**Usage**

```r
st1(x1, z1, x0, z0)
```

**Arguments**

- x1: a numeric vector
- z1: a numeric vector
- x0: a numeric vector
- z0: a numeric vector
**Value**

p-value of test

**Author(s)**

Danyang Yu <danyangyu@hnu.edu.cn>, Weiliang Qiu <stwxq@channing.harvard.edu>

**References**

Danyang Yu, Zeyu Zhang, Kimberly Glass, Jessica Su, Dawn L. DeMeo, Kelan Tantisira, Scott T. Weiss, Weiliang Qiu (corresponding author). New Statistical Methods for Constructing Robust Differential Correlation Networks to characterize the interactions among miRNA. Scientific Reports 9, Article number: 3499 (2019)

**Examples**

```r
x1 = ghdist(n=100, g=0.2, h=0.2)
x0 = ghdist(n=100, g=0.2, h=0.2)
z1 = x1 + ghdist(n=100, g=0.2, h=0.2)
z0 = x0 + ghdist(n=100, g=0.2, h=0.2)
p = st2(x1, z1, x0, z0)
print(p)
```

**Description**

Compute p-value for the equal correlation test with mad-replacing-Pearson correlation based on a logistic regression model corresponding to two independent groups

**Usage**

```r
st2(x1, z1, x0, z0)
```

**Arguments**

- `x1`: a numeric vector
- `z1`: a numeric vector
- `x0`: a numeric vector
- `z0`: a numeric vector

**Value**

p-value of test
Author(s)

Danyang Yu <danyangyu@hnu.edu.cn>, Weiliang Qiu <stwxq@channing.harvard.edu>

References


Examples

x1=ghdist(n=100,g=0.2,h=0.2)
x0=ghdist(n=100,g=0.2,h=0.2)
z1=x1+ghdist(n=100,g=0.2,h=0.2)
z0=x0+ghdist(n=100,g=0.2,h=0.2)
p=st2(x1,z1,x0,z0)
print(p)

Description

Compute p-value for the equal correlation test with percentage bend correlation based on a logistic regression model corresponding to two independent groups

Usage

st3(x1,z1,x0,z0)

Arguments

x1 a numeric vector
z1 a numeric vector
x0 a numeric vector
z0 a numeric vector

Value

p-value of test

Author(s)

Danyang Yu <danyangyu@hnu.edu.cn>, Weiliang Qiu <stwxq@channing.harvard.edu>
References


Examples

```r
x1 = ghdist(n=100, g=0.2, h=0.2)
x0 = ghdist(n=100, g=0.2, h=0.2)
z1 = x1 + ghdist(n=100, g=0.2, h=0.2)
z0 = x0 + ghdist(n=100, g=0.2, h=0.2)
p = st3(x1, z1, x0, z0)
print(p)
```

Description

Compute p-value for the equal correlation test with Spearman correlation based on a logistic regression model corresponding to two independent groups.

Usage

```r
st4(x1, z1, x0, z0)
```

Arguments

- `x1`: a numeric vector
- `z1`: a numeric vector
- `x0`: a numeric vector
- `z0`: a numeric vector

Value

p-value of test

Author(s)

Danyang Yu <danyangyu@hnu.edu.cn>, Weiliang Qiu <stwxq@channing.harvard.edu>

References

Examples

```r
x1 = ghdist(n=100, g=0.2, h=0.2)
x0 = ghdist(n=100, g=0.2, h=0.2)
z1 = x1 + ghdist(n=100, g=0.2, h=0.2)
z0 = x0 + ghdist(n=100, g=0.2, h=0.2)
p = stU(x1, z1, x0, z0)
print(p)
```

Description

# Compute p-value for the equal correlation test with combination of Spearman correlation and percentage bend correlation based on a logistic regression model corresponding to two independent groups

Usage

```r
st5(x1, z1, x0, z0)
```

Arguments

- `x1`: a numeric vector
- `z1`: a numeric vector
- `x0`: a numeric vector
- `z0`: a numeric vector

Value

p-value of test

Author(s)

Danyang Yu <danyangyu@hnu.edu.cn>, Weiliang Qiu <stwxq@channing.harvard.edu>

References

Examples

\[
x_1 = \text{ghdist}(n=100, g=0.2, h=0.2) \\
x_0 = \text{ghdist}(n=100, g=0.2, h=0.2) \\
z_1 = x_1 + \text{ghdist}(n=100, g=0.2, h=0.2) \\
z_0 = x_0 + \text{ghdist}(n=100, g=0.2, h=0.2) \\
p = \text{st6}(x_1, z_1, x_0, z_0) \\
\text{print}(p)
\]

Description

Compute p-value for the equal correlation test with another way to combine Spearman correlation and percentage bend correlation based on a multiple logistic regression model corresponding to two independent groups.

Usage

\[
\text{st6}(x_1, z_1, x_0, z_0)
\]

Arguments

- \( x_1 \): a numeric vector
- \( z_1 \): a numeric vector
- \( x_0 \): a numeric vector
- \( z_0 \): a numeric vector

Value

p-value of test

Author(s)

Danyang Yu <danyangyu@hnu.edu.cn>, Weiliang Qiu <stwxq@channing.harvard.edu>

References

Examples

```plaintext
x1 = ghdist(n=100, g=0.2, h=0.2)
x0 = ghdist(n=100, g=0.2, h=0.2)
z1 = x1 + ghdist(n=100, g=0.2, h=0.2)
z0 = x0 + ghdist(n=100, g=0.2, h=0.2)
p = st6(x1, z1, x0, z0)
print(p)
```
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