Package 'corTest'

February 11, 2019

Type Package

Title Robust Tests for Equal Correlation

Version 0.9.7

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Description There are 6 novel robust tests for equal correlation. They are all based on logistic regressions. U are proportion to different types of correlation in 6 methods. The ST1() is based on Pearson correlation. ST2() improved ST1() by using median absolute deviation. ST3() utilized type M correlation and ST4() used Spearman correlation. ST5() and ST6() used two different ways to combine ST3() and ST4(). We highly recommend ST5() according to the passage New Statistical Methods for Constructing Robust Differential Correlation Networks (expected to be public).

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Encoding UTF-8

LazyData true

Depends R (>= 3.4.0)

Imports MASS, graphics, stats

NeedsCompilation no

Repository CRAN

Date/Publication 2019-02-11 08:03:17 UTC

R topics documented:

`fisher_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*(n-1)).

Usage

```
fisher_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

Danyang Yu, Zeyu Zhang, Kimberly Glass, Jessica Su, Dawn L. DeMeo, Kelan Tantisira, Scott T. Weiss, Weiliang Qiu(2018). New Statistical Methods for Constructing Robust Differential Correlation Networks.(expected to be public)

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=fisher_transfer_test(x1,z1,x0,z0)
print(p)
```

ghdist *generating varibles from g-and-h distribution*

Description

generating varibles from g-and-h distribution

Usage

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

Arguments

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

Value

n varibles generated from g-and-h distribution

Examples

```
x=ghdist(50,0.2,0.2)
print(x)
```

st1 *test for equal correlation*

Description

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

Usage

```
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(2018). New Statistical Methods for Constructing Robust Differential Correlation Networks.(expected to be public)

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=st1(x1,z1,x0,z0)
print(p)
```

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st2 *install*

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

```
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

Danyang Yu, Zeyu Zhang, Kimberly Glass, Jessica Su, Dawn L. DeMeo, Kelan Tantisira, Scott T. Weiss, Weiliang Qiu(2018). New Statistical Methods for Constructing Robust Differential Correlation Networks.(expected to be public)

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)
```

`st3` *install*

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

Danyang Yu, Zeyu Zhang, Kimberly Glass, Jessica Su, Dawn L. DeMeo, Kelan Tantisira, Scott T. Weiss, Weiliang Qiu(2018). New Statistical Methods for Constructing Robust Differential Correlation Networks.(expected to be public)

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=st3(x1,z1,x0,z0)
print(p)
```

`st4` *install*

Description

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

Usage

```
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

Danyang Yu, Zeyu Zhang, Kimberly Glass, Jessica Su, Dawn L. DeMeo, Kelan Tantisira, Scott T. Weiss, Weiliang Qiu(2018). New Statistical Methods for Constructing Robust Differential Correlation Networks.(expected to be public)

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=st4(x1,z1,x0,z0)
print(p)
```

st5 *install*

Description

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

Usage

```
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

Danyang Yu, Zeyu Zhang, Kimberly Glass, Jessica Su, Dawn L. DeMeo, Kelan Tantisira, Scott T. Weiss, Weiliang Qiu(2018). New Statistical Methods for Constructing Robust Differential Correlation Networks.(expected to be public)

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=st5(x1,z1,x0,z0)
print(p)
```

st6 *install*

Description

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

Usage

```
st6(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(2018). New Statistical Methods for Constructing Robust Differential Correlation Networks.(expected to be public)

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=st6(x1,z1,x0,z0)
print(p)
```

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