Package 'symmetry'

April 18, 2017

Title What the Package Does (one line, title case)

Version 0.0.0.9000

Description What the package does (one paragraph).

Depends R (>= 3.1.0)

License What license is it under?

Encoding UTF-8

LazyData true

Imports Rcpp, parallel

LinkingTo Rcpp

RoxygenNote 6.0.1

SystemRequirements C++11

Suggests knitr,
rmarkdown

VignetteBuilder knitr

R topics documented:

I1 *Calculate _ test statistic (see 'Value' for formula)*

Description

Calculate _ test statistic (see 'Value' for formula)

Usage

```
I1(X, k)
```

Arguments

X	the sample for which to calculate the statistic
k	the value of parameter 'k' used in the formula

Value

The value of the test statistic given by the formula:

$$\frac{1}{n\binom{n}{2k}} \sum_{\mathcal{I}_{2k}} \sum_{i_{2k+1}=1}^{n} I\{|X_{(k),X_{i_1},\ldots,X_{i_{2k}}}| < |X_{2k+1}|\} - I\{|X_{(k+1),X_{i_1},\ldots,X_{i_{2k}}}| < |X_{2k+1}|\}$$

Examples

```
set.seed(1)
X <- rnorm(50)
I1(X, 2)
```

I2 *Calculate _ test statistic (see 'Value' for formula)*

Description

Calculate _ test statistic (see 'Value' for formula)

Usage

```
I2(X)
```

Arguments

X	the sample for which to calculate the statistic

Value

The value of the test statistic given by the formula:

$$\frac{1}{n^4} \sum_{i,j,a,b=1}^{n} I\{|X_i - X_j| < X_a + X_b\} - I\{|X_i + X_j| < X_a + X_b\}$$

Examples

```
set.seed(1)
X <- rnorm(50)
I2(X)
```

`I2HU` *Calculate _ test statistic (see 'Value' for formula)*

Description

Calculate _ test statistic (see 'Value' for formula)

Usage

```
I2HU(X)
```

Arguments

`X`	the sample for which to calculate the statistic

Value

The value of the test statistic given by the formula:

$$\frac{1}{n^2\binom{n}{2}} \sum_{1\le i<j\le n} \sum_{a,b=1}^{n} I\{|X_i - X_j| < X_a + X_b\} - I\{|X_i + X_j| < X_a + X_b\}$$

Examples

```
set.seed(1)
X <- rnorm(50)
I2HU(X)
```

`K1` *Calculate _ test statistic (see 'Value' for formula)*

Description

Calculate _ test statistic (see 'Value' for formula)

Usage

```
K1(X, k)
```

Arguments

`X`	the sample for which to calculate the statistic
`k`	the value of parameter 'k' used in the formula

Value

The value of the test statistic given by the formula:

$$\sup_{t>0} \left| \frac{1}{\binom{n}{2k}} \sum_{\mathcal{I}_{2k}} I\{|X_{(k),X_{i_1},\ldots,X_{i_{2k}}}| < t\} - I\{|X_{(k+1),X_{i_1},\ldots,X_{i_{2k}}}| < t\} \right|$$

Examples

```
set.seed(1)
X <- rnorm(50)
K1(X, 2)
```

K2 *Calculate _ test statistic (see 'Value' for formula)*

Description

Calculate _ test statistic (see 'Value' for formula)

Usage

```
K2(X)
```

Arguments

X	the sample for which to calculate the statistic

Value

The value of the test statistic given by the formula:

$$\sup_{t>0} \frac{1}{n^2} \left| \sum_{i,j=1}^{n} I\{|X_i - X_j| < t\} - I\{|X_i + X_j| < t\} \right|$$

Examples

```
set.seed(1)
X <- rnorm(50)
K2(X)
```

K2U *Calculate _ test statistic (see 'Value' for formula)*

Description

Calculate _ test statistic (see 'Value' for formula)

Usage

```
K2U(X)
```

Arguments

X	the sample for which to calculate the statistic

Value

The value of the test statistic given by the formula:

$$\sup_{t>0} \frac{1}{\binom{n}{2}} \left| \sum_{1 \le i < j \le n} I\{|X_i - X_j| < t\} - I\{|X_i + X_j| < t\} \right|$$

Examples

```
set.seed(1)
X <- rnorm(50)
K2U(X)
```

parTvalues *Simulate the distribution of a test statistic in parallel*

Description

This is just a parallel version of the Tvalues function, all arguments apply for this function. See Tvalues.

Usage

```
parTvalues(N, n, dist = list(), TS = list(), freecores = 0)
```

Arguments

N	the number of simulations to do
n	the sample size for each simulation
dist	a list which specifies the null distribution (see details)
TS	a list which specifies the test statistic to use (see details)
freecores	how many cores to leave unused (0 for maximum use of cpu)

Value

A vector of size N, each element being the value of the statistic TS on simulated samples of size n.

Examples

```
parTvalues(1000, 50, list(name='norm'), list(name='I1', k=2))
parTvalues(1000, 50, list(name='unif', min=-1, max=1), list(name='I2'))
parTvalues(1000, 50, list(name='logis', loc=0.5), list(name='K1', k=2))
parTvalues(1000, 50, list(name='exp'), list(name='K2'))
```

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symmetry *symmetry: A package which implements tests for symmetry‘*

Description

symmetry: A package which implements tests for symmetry‘

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test_power *Calculate the power of a test*

Description

This function calculates the power of a test given the null and alternative T values and the significance level.

Usage

```
test_power(t0, t1, alpha = 0.05)
```

Arguments

t0	the vector of null T values
t1	the vector of alternative T values
alpha	the significance level

Tvalues *Simulate the distribution of a test statistic*

Description

Simulates the distribution of the specified test statistic under the given null distribution.

Usage

```
Tvalues(N, n, dist = list(), TS = list())
```

Arguments

N	the number of simulations to do
n	the sample size for each simulation
dist	a list which specifies the null distribution (see details)
TS	a list which specifies the test statistic to use (see details)

Details

The dist argument is a list which must contain a field called "name" which determines which distribution to use (e.g. "norm", "unif", "exp", etc.) and, if needed, the parameters for the distribution. The name must be such that the function "r"+name exists ("rnorm", "runif", "rexp", etc). Further parameters are passed to that function.

The TS argument is a list which must contain a field called "name" which specifies which test statistic function to use for each sample. The name can be "I1", "K1", "I2", "K2" for statistics implemented by us, or any other statistic for which an R function exists (e.g. "mean", "var", etc.).

Value

A vector of size N, each element being the value of the statistic TS on simulated samples of size n.

Examples

```
Tvalues(1000, 50, list(name='norm'), list(name='I1', k=2))
Tvalues(1000, 50, list(name='unif', min=-1, max=1), list(name='I2'))
Tvalues(1000, 50, list(name='logis', loc=0.5, sca=1), list(name='K1', k=2))
Tvalues(1000, 50, list(name='exp'), list(name='K2'))
```

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