

# Package: testcorr (via r-universe)

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**Type** Package

**Title** Testing Zero Correlation

**Version** 0.2.0

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**Description** Computes the test statistics for examining the significance of autocorrelation in univariate time series, cross-correlation in bivariate time series, Pearson correlations in multivariate series and test statistics for i.i.d. property of univariate series given in Dalla, Giraitis and Phillips (2020), <<https://cowles.yale.edu/sites/default/files/files/pub/d21/d2194-r.pdf>>.

**License** GPL-3

**Encoding** UTF-8

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ac.test                      *Testing zero autocorrelation*

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### Description

The function `ac.test` computes the test statistics for examining the null hypothesis of zero autocorrelation for univariate time series given in Dalla, Giraitis and Phillips (2020).

### Usage

```
ac.test(x, max.lag, alpha = 0.05, lambda = 2.576, plot = TRUE,
        table = TRUE, var.name = NULL, scale.font = 1)
```

### Arguments

<code>x</code>	A numeric vector or a univariate numeric time series object or a data frame.
<code>max.lag</code>	Maximum lag at which to calculate the test statistics.
<code>alpha</code>	Significance level for hypothesis testing used in the plots. Default is 0.05.
<code>lambda</code>	Threshold in $\tilde{Q}$ test statistics. Default is 2.576.
<code>plot</code>	Logical. If TRUE the sample autocorrelations with their confidence bands and the cumulative statistics with their critical values are plotted. Default is TRUE.
<code>table</code>	Logical. If TRUE the sample autocorrelations, the confidence bands, the test statistics and their p-values are printed out. Default is TRUE.
<code>var.name</code>	NULL or a character string specifying the variable name. If NULL and <code>x</code> has name, the name of <code>x</code> is used. If NULL and <code>x</code> has no name, the string "x" is used. Default is NULL.
<code>scale.font</code>	A positive number indicating the scaling of the font size in the plots. Default is 1.

### Details

The standard  $t$  and robust  $\tilde{t}$  statistics are for testing the null hypothesis  $H_0 : \rho_k = 0$  at lags  $k = 1, \dots, \text{max.lag}$ , and the standard  $LB$  and robust  $\tilde{Q}$  statistics are for testing the null hypothesis  $H_0 : \rho_1 = \dots = \rho_m = 0$  at lags  $m = 1, \dots, \text{max.lag}$ , where  $\rho_k$  denotes the autocorrelation of  $x_t$  at lag  $k$ .

### Value

An object of class "ac.test", which is a list with the following components:

<code>lag</code>	The lags used.
<code>ac</code>	The sample autocorrelations.
<code>scb</code>	The lower and upper limit of the confidence bands based on the standard test statistics.

rcb	The lower and upper limit of the confidence bands based on the robust test statistics.
t	The $t$ test statistics.
pvt	The p-values for the $t$ test statistics.
ttilde	The $\tilde{t}$ test statistics.
pvttilde	The p-values for the $\tilde{t}$ test statistics.
lb	The $LB$ test statistics.
pvlb	The p-values for the $LB$ test statistics.
qtilde	The $\tilde{Q}$ test statistics.
pvtqtilde	The p-values for the $\tilde{Q}$ test statistics.

**Note**

Missing values are not allowed.

**Author(s)**

Violetta Dalla, Liudas Giraitis and Peter C. B. Phillips

**References**

Dalla, V., Giraitis, L. and Phillips, P. C. B. (2020). "Robust Tests for White Noise and Cross-Correlation". Cowles Foundation, Discussion Paper No. 2194, <https://cowles.yale.edu/sites/default/files/files/pub/d21/d2194-r.pdf>.

**Examples**

```
x <- rnorm(100)
ac.test(x, max.lag = 10)
```

---

cc.test

*Testing zero cross-correlation*

---

**Description**

The function `cc.test` computes the test statistics for examining the null hypothesis of zero cross-correlation for bivariate time series given in Dalla, Giraitis and Phillips (2020).

**Usage**

```
cc.test(x, y, max.lag, alpha = 0.05, lambda = 2.576, plot = TRUE,
        table = TRUE, var.names = NULL, scale.font = 1)
```

**Arguments**

x	A numeric vector or a univariate numeric time series object or a data frame.
y	A numeric vector or a univariate numeric time series object or a data frame.
max.lag	Maximum lag at which to calculate the test statistics.
alpha	Significance level for hypothesis testing used in the plots. Default is 0.05.
lambda	Threshold in $\tilde{Q}$ test statistics. Default is 2.576.
plot	Logical. If TRUE the sample cross-correlations with their confidence bands and the cumulative statistics with their critical values are plotted. Default is TRUE.
table	Logical. If TRUE the sample cross-correlations, the confidence bands, the test statistics and their p-values are printed out. Default is TRUE.
var.names	NULL or a character string specifying the variable names. If NULL and x,y have names, the names of x,y are used. If NULL and x,y have no names, the string c("x","y") is used. Default is NULL.
scale.font	A positive number indicating the scaling of the font size in the plots. Default is 1.

**Details**

The standard  $t$  and robust  $\tilde{t}$  statistics are for testing the null hypothesis  $H_0 : \rho_k = 0$  at lags  $k = -max.lag, \dots, -1, 0, 1, max.lag$ , and the standard  $HB$  and robust  $\tilde{Q}$  statistics are for testing the null hypothesis  $H_0 : \rho_0 = \dots = \rho_m = 0$  at lags  $m = -max.lag, \dots, -1, 0, 1, max.lag$ , where  $\rho_k$  denotes the cross-correlation of  $x_t$  and  $y_{t-k}$  at lag  $k$ .

**Value**

An object of class "cc.test", which is a list with the following components:

lag	The lags used.
cc	The sample cross-correlations.
scb	The lower and upper limit of the confidence bands based on the standard test statistics.
rcb	The lower and upper limit of the confidence bands based on the robust test statistics.
t	The $t$ test statistics.
pvt	The p-values for the $t$ test statistics.
ttilde	The $\tilde{t}$ test statistics.
pvttilde	The p-values for the $\tilde{t}$ test statistics.
hb	The $HB$ test statistics.
pvhb	The p-values for the $HB$ test statistics.
qtilde	The $\tilde{Q}$ test statistics.
pvqtilde	The p-values for the $\tilde{Q}$ test statistics.

**Note**

Missing values are not allowed.

**Author(s)**

Violetta Dalla, Liudas Giraitis and Peter C. B. Phillips

**References**

Dalla, V., Giraitis, L. and Phillips, P. C. B. (2020). "Robust Tests for White Noise and Cross-Correlation". Cowles Foundation, Discussion Paper No. 2194, <https://cowles.yale.edu/sites/default/files/files/pub/d21/d2194-r.pdf>.

**Examples**

```
x <- rnorm(100)
y <- rnorm(100)
cc.test(x, y, max.lag = 10)
```

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iid.test

*Testing iid property*


---

**Description**

The function `iid.test` computes the test statistics for examining the null hypothesis of i.i.d. property for univariate series given in Dalla, Giraitis and Phillips (2020).

**Usage**

```
iid.test(x, max.lag, alpha = 0.05, plot = TRUE, table = TRUE,
         var.name = NULL, scale.font = 1)
```

**Arguments**

<code>x</code>	A numeric vector or a univariate numeric time series object or a data frame.
<code>max.lag</code>	Maximum lag at which to calculate the test statistics.
<code>alpha</code>	Significance level for hypothesis testing used in the plots. Default is 0.05.
<code>plot</code>	Logical. If TRUE the test statistics and their critical values are plotted. Default is TRUE.
<code>table</code>	Logical. If TRUE the test statistics and their p-values are printed out. Default is TRUE.
<code>var.name</code>	NULL or a character string specifying the variable name. If NULL and <code>x</code> has name, the name of <code>x</code> is used. If NULL and <code>x</code> has no name, the string "x" is used. Default is NULL.
<code>scale.font</code>	A positive number indicating the scaling of the font size in the plots. Default is 1.

**Details**

The  $J_{x,|x|}$  and  $J_{x,x^2}$  statistics are for testing the null hypothesis of i.i.d. at lag  $k$ ,  $k = 1, \dots, max.lag$ , and the  $C_{x,|x|}$  and  $C_{x,x^2}$  statistics are for testing the null hypothesis of i.i.d. at lags  $1, \dots, m$ ,  $m = 1, \dots, max.lag$ .

**Value**

An object of class "iid.test", which is a list with the following components:

lag	The lags used.
jab	The $J_{x, x }$ test statistics.
pvjab	The p-values for the $J_{x, x }$ test statistics.
jsq	The $J_{x,x^2}$ test statistics.
pvjsq	The p-values for the $J_{x,x^2}$ test statistics.
cab	The $C_{x, x }$ test statistics.
pvcab	The p-values for the $C_{x, x }$ test statistics.
csq	The $C_{x,x^2}$ test statistics.
pvcsq	The p-values for the $C_{x,x^2}$ test statistics.

**Note**

Missing values are not allowed.

**Author(s)**

Violetta Dalla, Liudas Giraitis and Peter C. B. Phillips

**References**

Dalla, V., Giraitis, L. and Phillips, P. C. B. (2020). "Robust Tests for White Noise and Cross-Correlation". Cowles Foundation, Discussion Paper No. 2194, <https://cowles.yale.edu/sites/default/files/files/pub/d21/d2194-r.pdf>.

**Examples**

```
x <- rnorm(100)
iid.test(x, max.lag = 10)
```

---

rcorr.test

*Testing zero Pearson correlation*


---

### Description

The function `rcorr.test` computes the test statistics for examining the null hypothesis of zero Pearson correlation for multivariate series in Dalla, Giraitis and Phillips (2020).

### Usage

```
rcorr.test(x, plot = TRUE, table = TRUE, var.names = NULL,
           scale.font = 1)
```

### Arguments

<code>x</code>	A numeric matrix or a multivariate numeric time series object or a data frame.
<code>plot</code>	Logical. If TRUE the sample Pearson correlations and the p-values for significance are plotted. Default is TRUE.
<code>table</code>	Logical. If TRUE the sample Pearson correlations and the p-values for significance are printed out. Default is TRUE.
<code>var.names</code>	NULL or a character string specifying the variable names. If NULL and <code>x</code> has names, the names of <code>x</code> are used. If NULL and <code>x</code> has no names, the string <code>c("x[1]", "x[2]", ...)</code> is used. Default is NULL.
<code>scale.font</code>	A positive number indicating the scaling of the font size in the plots. Default is 1.

### Details

The p-value of the robust  $\tilde{t}$  statistic is for testing the null hypothesis  $H_0 : \rho_{i,j} = 0$ , where  $\rho_{i,j}$  denotes the correlation of  $x_i$  and  $x_j$ .

### Value

An object of class "rcorr.test", which is a list with the following components:

<code>pc</code>	The sample Pearson correlations.
<code>pv</code>	The p-values for the $\tilde{t}$ test statistics.

### Note

Missing values are not allowed.

### Author(s)

Violetta Dalla, Liudas Giraitis and Peter C. B. Phillips

**References**

Dalla, V., Giraitis, L. and Phillips, P. C. B. (2020). "Robust Tests for White Noise and Cross-Correlation". Cowles Foundation, Discussion Paper No. 2194, <https://cowles.yale.edu/sites/default/files/files/pub/d21/d2194-r.pdf>.

**Examples**

```
x <- matrix(rnorm(400),100)
rcorr.test(x)
```



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