TESTS of randomness and normality

acf(): vague

adf.test(): computes the Augmented Dickey-Fuller test for the null that 'x' has a unit root (tseries)

bds.test(): computes and prints the BDS test statistic for the null that 'x' is a series of i.i.d. random variables (tseries)

Box.test():Compute the Box-Pierce or Ljung-Box test statistic for examining null hypothesis of independence in a given time series. Sometimes known as portmanteau tests (stats)

bptest(): performs the Breusch-Pagan test for heteroskedasticity of residuals (lmtest)

bds,test(): Brock–Dechert–Sheinkman Test Null that x is a series of i.i.d. random variables (tseries)

dwtest(): performs the Durbin-Watson test for autocorrelation of residuals Alternative – lag one autocorrelation (lmtest)

jarque.bera.test(): Jarque-Bera test for normality (tseries)

In statistics, the **Jarque–Bera test** is a goodness-of-fit test of whether sample data have the skewness and kurtosis matching a normal distribution. The test is named after Carlos Jarque and Anil K. Bera. The test statistic *JB* is defined as

$$JB = \frac{n}{6}\left(S^2 + \frac{1}{4}(K-3)^2\right)$$

where *n* is the number of observations (or degrees of freedom in general); *S* is the sample skewness, and *K* is the sample kurtosis:

$$S = \frac{\hat{\mu}_3}{\hat{\sigma}^3} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^3}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^{3/2}},$$

$$K = \frac{\hat{\mu}_4}{\hat{\sigma}^4} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^4}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^{2}},$$

kpss.test(): Kwiatkowski-Phillips-Schmidt-Shin test for null hypothesis that x is level or trend stationary (tseries)

runs(): test the independence of a sequence of random variables by checking whether there are too many or too few runs above (or below) the median. (TSA)

shapiro.test(): Shapiro-Wilk Normality Test (stats)

spec.pgram(): CI (stats)

tsdiag(): a generic function to plot time-series diagnostics (stat)

Shapiro-Wilk Normality Test

Description

Performs the Shapiro-Wilk test of normality.

Usage

```
shapiro.test(x)
```

Arguments

`x`	a numeric vector of data values. Missing values are allowed, but the number of non-missing values must be between 3 and 5000.

Value

A list with class `"htest"` containing the following components:

`statistic`	the value of the Shapiro-Wilk statistic.
`p.value`	an approximate p-value for the test. This is said in Royston (1995) to be adequate for `p.value < 0.1`.
`method`	the character string `"Shapiro-Wilk normality test"`.
`data.name`	a character string giving the name(s) of the data.

Examples

```
shapiro.test(rnorm(100, mean = 5, sd = 3))
shapiro.test(runif(100, min = 2, max = 4))
```