Package ‘MultipleBubbles’

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Title Test and Detection of Explosive Behaviors for Time Series
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Description Provides the Augmented Dickey-Fuller test and its variations to check the existence of bubbles (explosive behavior) for time series, based on the article by Peter C. B. Phillips, Shuping Shi and Jun Yu (2015a) <doi:10.1111/iere.12131>. Some functions may take a while depending on the size of the data used, or the number of Monte Carlo replications applied.
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**ADF_FL**

*Augmented Dickey-Fuller Statistic*

**Description**

Calculate the Augmented Dickey-Fuller Statistic with a fixed lag order.

**Usage**

```
ADF_FL(y, adflag = 0, mflag = 1)
```

**Arguments**

- `y`: the time series to be used.
- `adflag`: is the lag order.
- `mflag`: 1 for ADF with constant and without trend, 2 for ADF with constant and trend and 3 for ADF without constant and trend.

**References**


**Examples**

```
y <- rnorm(10)
ADF_FL(y, adflag = 1, mflag = 2)
```

---

**ADF_IC**

*Augmented Dickey-Fuller Statistic by AIC or BIC*

**Description**

Calculate the Augmented Dickey-Fuller Statistic with lag order selected by AIC or BIC.

**Usage**

```
ADF_IC(y, adflag, mflag, IC)
```

**Arguments**

- `y`: the time series to be used.
- `adflag`: the maximum lag order.
- `mflag`: 1 for ADF with constant and without trend, 2 for ADF with constant and trend and 3 for ADF without constant and trend.
- `IC`: 1 for AIC and 2 for BIC.
badf

References


Examples

```r
y <- rnorm(10)
ADF.IC(y, adflag = 1, mflag = 2, IC = 1)
ADF.IC(y, adflag = 1, mflag = 2, IC = 2)
```

badf  Backward Augmented Dickey-Fuller Sequence.

Description

In this program, we calculate critical value sequences for the backward ADF statistic sequence for a matrix generated from a standard Normal distribution.

Usage

```r
badf(m, t, adflag = 0, mflag = 1)
```

Arguments

- `m`  Number of Monte Carlo replications. Must be bigger than 2.
- `t`  Sample size. Must be bigger than 2.
- `adflag`  Number of lags to be included in the ADF Test. Default equals 0.
- `mflag`  1 for ADF with constant and whithout trend, 2 for ADF with constant and trend and 3 for ADF without constant and trend.

References


Examples

```r
foo <- badf(m = 100, t = 50, adflag = 1, mflag = 1)
plot(foo$quantiles[2,], type = 'l')
```
bsadf

Critical values for backward SADF statistic sequence.

Description

Calculate critical value sequences for the backward sup ADF statistic sequence using Monte Carlo simulations for a sample generated from a Normal distribution.

Usage

bsadf(m, t, adflag = 0, mflag = 1)

Arguments

m
Number of Monte Carlo Simulations

t
Sample size.

adflag
is the lag order.

mflag
1 for ADF with constant and without trend, 2 for ADF with constant and trend and 3 for ADF without constant and trend.#' @keywords AugmentedDickey-FullerTest backwardSADF MonteCarlo.

References


Examples

foo <- bsadf(m = 20, t = 50, adflag = 1, mflag = 2)
plot(foo$quantiles[2,], type = 'l')

DGP

Random walk.

Description

Generate a random walk with drift 1/n.

Usage

DGP(n, niter)

Arguments

n
sample size. Number of rows in the generated matrix.

niter
number of columns in the generated matrix.
Examples

DGP(n = 100, niter = 10)

Description

Calculate critical value sequences for the generalized sup ADF statistic sequence using Monte Carlo simulations for a sample generated from a Normal distribution.

Usage

gsadf(m, t, adflag = 0, mflag = 1, swindow = floor(r0 * t))

Arguments

- **m**: Number of Monte Carlo Simulations. Default equals 2000. Must be bigger than 2.
- **t**: Sample size. Default equals 100. Must be bigger than 2.
- **adflag**: Number of lags to be included in the ADF Test. Default equals 0.
- **mflag**: 1 for ADF with constant and without trend, 2 for ADF with constant and trend and 3 for ADF without constant and trend.
- **swindow**: Minimum window size.

References


Examples

foo <- gsadf(m = 20, t = 50)
quant <- rep(foo$quantiles[2], 100)
plot(quant, type = 'l')
sadf

Critical values for sup ADF statistic sequence.

Description

Calculate critical value sequences for the sup ADF statistic sequence using Monte Carlo simulations for a sample generated from a Normal distribution.

Usage

sadf(m, t)

Arguments

m  Number of Monte Carlo Simulations. Default equals 2000. Must be bigger than 2.
   t  Sample size. Default equals 100. Must be bigger than 2.

References


Examples

foo <- sadf(m = 20, t = 50)
quant <- rep(foo$quantiles[2], 100)
plot(quant, type = 'l')

sadf_gsadf

Sup ADF and generalized sup ADF statistics for a time series.

Description

Calculate the sup ADF and the generalized sup ADF statistics using the backward ADF statistic sequence and the backward SADF statistic sequence, respectively.

Usage

sadf_gsadf(y, adflag, mflag, IC, parallel = FALSE)
Arguments

- \( y \) : the time series.
- \( \text{adf} \text{flag} \) : the lag order for the ADF test.
- \( \text{m} \text{flag} \) : 1 for ADF with constant and without trend, 2 for ADF with constant and trend and 3 for ADF without constant and trend.
- \( \text{ic} \) : 1 for AIC and 2 for BIC.
- \( \text{parallel} \) : If TRUE, uses parallel computing for the loop. If the data is large it could be faster, but usually it is slower for small data.

References


Description

The S&P 500 price dividend ratio from January 1871 to December 2010.

Format

A vector with the S&P 500 price dividend ratio.

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