Package ‘GMZTests’

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The function `deltadmc.test` performs a statistical test for Delta DMC cross-correlation coefficient from three univariate ARFIMA processes. Its usage is as follows:

```r
deltadmc.test(x1, x2, y, k, m, nu, rep, method)
```

**Arguments**

- **x1**: A vector containing univariate time series.
- **x2**: A vector containing univariate time series.
- **y**: A vector containing univariate time series.
- **k**: An integer value indicating the boundary of the division \( N/k \). The smallest value of \( k \) is 4.
- **m**: An integer value or a vector of integer values indicating the size of the window for the polynomial fit.
- **nu**: An integer value. See the DCCA package.
- **rep**: An integer value indicating the number of repetitions.
- **method**: A character string indicating which correlation coefficient is to be used. If `method = "rhodcca"` the dmc coefficient is generated from the DCCA coefficient. If `method = "dmca"`, the dmc coefficient is generated from the DMCA coefficient.

**Details**

This function includes the following measures: timescale, dmc_before, dmc_after, deltadmc.
deltadmca.test

Value
An list containing "timescale", "dmc_before", "dmc_after", "deltadmc", "CI_0.90", "CI_0.95", "CI_0.99".

References

Examples
```r
x1 <- rnorm(100)
x2 <- rnorm(100)
y <- rnorm(100)
deltadmca.test(x1,x2,y, k=10, m=c(4:6), nu=0, rep=10, method="rhodcca")
deltadmca.test(x1,x2,y, k=10, m=c(4:6), nu=0, rep=10, method="dmca")
```

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deltadmca.test

Statistical test for Statistical test for DMCA cross-correlation coefficient.

Description
This function performs the statistical test for Detrending moving-average cross-correlation coefficient from two univariate ARFIMA process.

Usage
deltadmca.test(x, y, k, m, rep)

Arguments
- `x`: A vector containing univariate time series.
- `y`: A vector containing univariate time series.
- `k`: An integer value indicating the boundary of the division \((N/k)\). The smallest value of `k` is 4.
- `m`: an integer value or a vector of integer values indicating the size of the window for the polynomial fit.
- `rep`: An integer value indicating the number of repetitions.

Details
This function include following measures: timescale, rho_before, rho_after, deltarho
deltarhodcca.test

Value
An list containing "timescale", "mean", "sd", "rho_before", "rho_after", "deltarho", "CI_0.90", "CI_0.95", "CI_0.99".

References

Examples
x <- rnorm(1000)
y <- rnorm(1000)
deltadmca.test(x,y,k=100,m=c(4:6),rep=10)

deltarhodcca.test       Statistical test for Delta RHODCCA cross-correlation coefficient.

Description
This function performs the statistical test for Delta RHODCCA cross-correlation coefficient from two univariate ARFIMA process.

Usage
deltarhodcca.test(x, y, k, m, nu, rep)

Arguments
x          A vector containing univariate time series.
y          A vector containing univariate time series.
k          An integer value indicating the boundary of the division \(N/k\). The smallest value of \(k\) is 4.
m          An integer value or a vector of integer values indicating the size of the window for the polynomial fit.
nu          An integer value. See the DCCA package.
rep         An integer value indicating the number of repetitions.

Details
This function includes the following measures: timescale, rho_before, rho_after, deltarho.
Value
An list containing "timescale", "mean", "sd", "rho_before", "rho_after", "deltarho", "CI_0.90", "CI_0.95", "CI_0.99".

References

Examples
```r
x <- rnorm(1000)
y <- rnorm(1000)
deltarho.dcca.test(x, y, k=100, m=c(4:6), nu=0, rep=10)
```

**Description**
This function performs the statistical test for the long-range correlation exponents obtained by the Detrended Fluctuation Analysis method.

**Usage**
dfa.test(y, npoints, rep, ts.sim, prob)

**Arguments**
- `y` A vector containing univariate time series.
- `npoints` The number of different window sizes that will be used to estimate the Fluctuation function in each zone. See nonlinearTseries package.
- `rep` An integer value indicating the number of repetitions.
- `ts.sim` An logical value. If TRUE, the confidence interval for alpha_dfa is obtained from a White Gaussian Noise. If FALSE, the confidence interval for alpha_dfa is obtained from the shuffling of the original series.
- `prob` An numeric value indicating the quantile of probability to be used in estimating confidence intervals by N(0,1).

**Details**
This function includes the following measures: alpha_dfa, se_alpha_dfa, r2_alpha_dfa, min_test, max_test, mean_test, median_test, sd_test, skewness_test, kurtosis_test, Jarquebera_test_pvalue, CL_lower_test, CL_upper_test.
dmc.test

Value

An rbind matrix containing "alpha_dfa","se_alpha_dfa","r2_alpha_dfa","min_alpha_dfa","max_test","mean_test","median_test","sd_test","skewness_test","kurtosis_test","jarquebera_test_pvalue", and confidence interval: "CI_lower_test","CI_upper_test".

References


Examples

```r
y=rnorm(1000)
dfa.test(y, npoints=15, rep=10,ts.sim="TRUE", prob=.95)
```

---

**dmc.test**

**Statistical test for Multiple Detrended Cross-Correlation Coefficient**

Description

This function performs the statistical test for DMC Cross-Correlation Coefficient based in White Gaussian Noise process.

Usage

dmc.test(N, k, m, method, nu, rep)

Arguments

- **N**: An integer value for the time series length.
- **k**: An integer value indicating the boundary of the division \(N/k\). The smallest value of \(k\) is 4.
- **m**: an integer value or a vector of integer values indicating the size of the window for the polynomial fit.
- **method**: A character string indicating which correlation coefficient is to be used. If method = "rhodcca" the dmc coefficient is generated from the DCCA coefficient. If method = "dmca", the dmc coefficient is generated from the DMCA coefficient.
- **nu**: An integer value. See the DCCA package.
- **rep**: An integer value indicating the number of repetitions.

Details

This function include following measures: w, timescale, dmc, rhodcca_yx1, rhodcca_yx2, rhodcca_x1x2
**dmca.test**

**Value**

An list containing "timescale", parameters of beta distribution: "shape1", "se1", "shape2", "se2" and confidence interval: "CI_0.90_upper", "CI_0.95_upper", "CI_0.99_upper".

**References**


**Examples**

```r
dmc.test(N=100, k=10, m=c(4:6), method="rhodcca", nu=0, rep=10)
dmc.test(N=100, k=10, m=c(4:6), method="dmca", nu=0, rep=10)
```

---

**Description**

This function performs the statistical test for Detrending moving-average cross-correlation coefficient based in White Gaussian Noise process.

**Usage**

```r
dmca.test(N, k, m, rep)
```

**Arguments**

- **N**
  - An integer value for the time series length.
- **k**
  - An integer value indicating the boundary of the division \((N/k)\). The smallest value of \(k\) is 4.
- **m**
  - An integer value or a vector of integer values indicating the size of the window for the polynomial fit.
- **rep**
  - An integer value indicating the number of repetitions.

**Details**

This function include following measures: timescale and cross-correlation \(yx\).

**Value**

An list containing "timescale", "mean", "sd" and confidence interval: "CI_0.90", "CI_0.95", "CI_0.99".
rhodcca.test

References


Examples

dmca.test(N=100, k=10, m=c(4:6), rep=10)

rhodcca.test (Statistical test for detrended cross-correlation coefficient)

Description

This function performs the statistical test for RHODCCA cross-correlation coefficient based in White Gaussian Noise process.

Usage

rhodcca.test(N, k, m, nu, rep)

Arguments

N
An integer value for the time series length.

k
An integer value indicating the boundary of the division \((N/k)\). The smallest value of \(k\) is 4.

m
an integer value or a vector of integer values indicating the size of the window for the polynomial fit.

nu
An integer value. See the DCCA package.

rep
An integer value indicating the number of repetitions.

Details

This function include following measures: timescale and cross-correlation yx.

Value

An list containing "timescale","mean", "sd" and confidence interval: "CI_0.90", "CI_0.95", "CI_0.99".

References


Examples

rhodcca.test(N=100, k=10, m=c(4:6), nu=0, rep=10)
Index

deltadmctest, 2
deltadmca.test, 3
deltarhodcca.test, 4
dfa.test, 5
dmc.test, 6
dmca.test, 7
rhcocca.test, 8