Package 'WaveLetLongMemory'

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Type Package

Title Estimating Long Memory Parameter using Wavelet

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Description

Estimation of the long memory parameter using wavelets. Other estimation techniques like GPH (Geweke and Porter-Hudak,1983, <DOI:10.1111/j.1467-9892.1983.tb00371.x>) and Semiparametric methods(Robinson, P. M.,1995, <DOI:10.1214/aos/1176324317>) also have included.

License GPL

Depends fracdiff, wmtsa

LazyData TRUE

NeedsCompilation no

Repository CRAN

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R topics documented:

`Wavelet` *Estimating Long Memory using wavelets*

Description

The function WVLM estimates the long memory prarameter using wavelets as well as using other two methods namely GPH and Semiparametric.

Usage

```
WVLM(Method,Xt,bandwidth,BetaLagParzen,typeWvtrans,filtertype)
```

Arguments

Method	GPH, SEMIPARAMETRIC, WAVELET
Xt	univariate time series
bandwidth	The bandwidth used in the regression equation
BetaLagParzen	exponent of the bandwidth used in the lag Parzen window
typeWvtrans	type of wavelet transform i.e. dwt or modwt
filtertype	Either a wt.filter object, a character string indicating which wavelet filter to use in the decomposition, or a numeric vector of wavelet coefficients

Value

Method	GPH, SEMIPARAMETRIC, WAVELET.
xt	univariate time series.
bandwidth	The bandwidth used in the regression equation.
WVLM	Out Approach.
GPH.Estimation	The GPH estimator is based on the regression equation using the periodogram function as an estimate of the spectral density.
SEM.Estimation	It is based on the regression equation using the smoothed periodogram function as an estimate of the spectral density..
Wavelet.Estimation	WAVELET method makes use Jensen (1994) estimator to estimate the memory parameter d in the ARFIMA(p,d,q) model based on wavelet technique.

Author(s)

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References

Geweke, J. and Porter-Hudak, S. (1983) The estimation and application of long memory time series models. Journal of Time Series Analysis 4(4), 221 to 238.

Robinson, P. M. (1995). Gaussian Semiparametric Estimation of Long Range Dependence. The Annals of Statistics 23 (5), 1630 to 1661.

Jensen, M.J.(1999). Using wavelets to obtain a consistent ordinary least squares estimator of the long-memory parameter journal of forecasting, Journal of Forecasting 18, 17 to 32.

Paul, R. K., Samanta, S. and Gurung, B. (2015). Monte Carlo simulation for comparison of different estimators of long memory parameter: An application of ARFIMA model for forecasting commodity price. Model Assisted Statistics and Application, 10(2), 116 to 127.

Reisen, V. A. (1994) Estimation of the fractional difference parameter in the ARFIMA(p,d,q) model using the smoothed periodogram. Journal Time Series Analysis, 15(1), 335 to 350.

Examples

```
## Simulating Long Memory Series
N <- 1000
PHI <- 0.2
THETA <- 0.1
SD <- 1
M <- 0
D <- 0.2
Seed <- 123

set.seed(Seed)
Sim.Series <- fracdiff::fracdiff.sim(n = N, ar = c(PHI), ma = c(THETA),
d = D, rand.gen = rnorm, sd = SD, mu = M)

Yt <- as.ts(Sim.Series$series)

## GPH Estimation
WVLM(Method="GPH",Xt=Yt,bandwidth = 0.5)

## SEMIPARAMETRIC Estimation
WVLM(Method="SEMIPARAMETRIC",Xt=Yt,bandwidth = 0.5,BetaLagParzen = 0.2)

## WAVELET Estimation using different filtertype
WVLM(Method="WAVELET",Xt=Yt,typeWvtrans = "modwt",filtertype = "haar")
WVLM(Method="WAVELET",Xt=Yt,typeWvtrans = "modwt",filtertype = "d6")
WVLM(Method="WAVELET",Xt=Yt,typeWvtrans = "modwt",filtertype = "s8")
```

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