Package 'WaveletArima'

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Type Package

Title Wavelet ARIMA Model

Version 0.1.1

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Description Fits hybrid Wavelet ARIMA model for time series forecasting using algorithm by Aminghafari and Poggi (2012) <doi:10.1142/S0219691307002002>.

License GPL

Imports stats, wavelets, fracdiff, forecast

LazyData TRUE

NeedsCompilation no

Repository CRAN

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R topics documented:

`WaveletFitting` *Wavelet transform using Maximal overlap discrete wavelet transform (MODWT) algorithm*

Description

Transforms the time series data by using hybrid MODWT algorithm using 'haar' filter.

Usage

```
WaveletFitting(ts,Wvlevels,bndry,FFlag)
```

Arguments

ts	univariate time series
Wvlevels	The level of wavelet decomposition
bndry	The boundary condition of wavelet decomposition
FFlag	The FastFlag condition of wavelet decomposition: True or False

Value

WaveletFitting	The wavelet trasnform of the series

References

Percival D. B. and Walden A. T. 2000. Wavelet Methods for Time-Series Analysis. Cambridge Univ. Press, U.K.

Paul R. K., Prajneshu and Ghosh H. 2013. Wavelet Frequency Domain Approach for Modelling and Forecasting of Indian Monsoon Rainfall Time-Series Data. Journal of the Indian society of agricultural statistics, 67, 319 to 327.

Paul, R.K. and Birthal, P.S. 2015. Investigating rainfall trend over India using wavelet technique. Journal of Water and Climate Change, 7, 365 to 378.

Paul, R. K. 2015. ARIMAX-GARCH-WAVELET Model for forecasting volatile data. Model Assisted Statistics and Application, 10, 243 to252.

Examples

```
N <- 100
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)
simts <- as.ts(Sim.Series$series)
Waveletlevels <- floor(log(length(simts))) # to obtain the maximum level for wavelet decomposition
WS <- WaveletFitting(ts=simts,Wvlevels=Waveletlevels,bndry='periodic',FFlag=TRUE)$WaveletSeries
```

WaveletFittingarma *Wavelet-ARIMA hybrid model for forecasting*

Description

Fits the time series data by using hybrid Wavelet-ARIMA algorithm.

Usage

```
WaveletFittingarma(ts,Waveletlevels,boundary,FastFlag,MaxARParam,MaxMAParam,NForecast)
```

Arguments

ts	univariate time series
Waveletlevels	The level of wavelet decomposition
boundary	The boundary condition of wavelet decomposition
FastFlag	The FastFlag condition of wavelet decomposition: True or False
MaxARParam	The maximum AR order for auto.arima
MaxMAParam	The maximum MA order for auto.arima
NForecast	The forecast horizon: A positive integer

Value

WaveletFittingarma
: The forecast of the series

References

Aminghafari, M. and Poggi, J.M. 2007. Forecasting time series using wavelets. Internationa Journal of Wavelets, Multiresolution and Inforamtion Processing, 5, 709 to 724

Percival D. B. and Walden A. T. 2000. Wavelet Methods for Time-Series Analysis. Cambridge Univ. Press, U.K.

Paul R. K., Prajneshu and Ghosh H. 2013. Wavelet Frequency Domain Approach for Modelling and Forecasting of Indian Monsoon Rainfall Time-Series Data. Journal of the Indian society of agricultural statistics, 67, 319 to 327.

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Sim.Series <- fracdiff::fracdiff.sim(n = N, ar = c(PHI), ma = c(THETA),
                                     d = D, rand.gen = rnorm, sd = SD, mu = M)
simts <- as.ts(Sim.Series$series)
```

```
#Waveletlevels <- floor(log(length(simts))) # to obtain the maximum level for wavelet decomposition
WaveletForecast<-WaveletFittingarma(ts=simts,Waveletlevels=floor(log(length(simts))),
boundary='periodic',FastFlag=TRUE,MaxARParam=5,MaxMAParam=5,NForecast=5)
```

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