

Package ‘WaveletANN’

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Type Package

Title Wavelet ANN Model

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Description Fits hybrid Wavelet ANN model for time series forecasting using algorithm by An-joy and Paul (2017) <DOI: 10.1007/s00521-017-3289-9>.

License GPL

Imports stats, wavelets, fracdiff, forecast

LazyData TRUE

NeedsCompilation no

Repository CRAN

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WaveletFitting	<i>Wavelet transform using Maximal overlap discrete wavelet transform (MODWT) algorithm</i>
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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 transform 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 to 252.

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

```

WaveletFittingann

Wavelet-ANN hybrid model for forecasting

Description

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

Usage

```
WaveletFittingann(ts,Waveletlevels,boundary,FastFlag,nonseaslag,seaslag,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
nonseaslag	The maximum non seasonal order
seaslag	The maximum seasonal order
NForecast	The forecast horizon: A positive integer

Value

```
WaveletFittingann
  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.

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 to 252.

Anjoy, P. and Paul, R.K. (2017). Comparative performance of wavelet-based neural network approaches. *Neural Computing and Applications*, DOI: 10.1007/s00521-017-3289-9.

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  
WaveletForecast<-WaveletFittingann(ts=simts,Waveletlevels=floor(log(length(simts))),  
boundary='periodic',FastFlag=TRUE,nonseaslag,seaslag,NForecast=5)
```

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