Package ‘WaveletArima’

October 12, 2022

Type Package

Title Wavelet-ARIMA Model for Time Series Forecasting

Version 0.1.2

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Description Noise in the time-series data significantly affects the accuracy of the ARIMA model. Wavelet transformation decomposes the time series data into sub-components to reduce the noise and help to improve the model performance. The wavelet-ARIMA model can achieve higher prediction accuracy than the traditional ARIMA model. This package provides Wavelet-ARIMA model for time series forecasting based on the algorithm by Aminghafari and Poggi (2012) and Paul and Anjoy (2018) <doi:10.1142/S0219691307002002> <doi:10.1007/s00704-017-2271-x>.

License GPL-3

Encoding UTF-8

RoxygenNote 7.2.0

Imports stats, wavelets, fracdiff, forecast

NeedsCompilation no

Repository CRAN

Date/Publication 2022-07-02 21:50:08 UTC

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WaveletFitting

Wavelet Transform Using Maximal Overlap Discrete Wavelet Transform (MODWT) Algorithm

Description
Transforms the time series data by using hybrid MODWT algorithm.

Usage
WaveletFitting(
    ts,
    WFilter = "haar",
    Wvlevels,
    bndry = "periodic",
    FFlag = TRUE
)

Arguments
- **ts** Univariate time series
- **WFilter** Wavelet filter use in the decomposition
- **Wvlevels** The level of wavelet decomposition
- **bndry** The boundary condition of wavelet decomposition: ‘periodic’ or ‘reflection’
- **FFlag** The FastFlag condition of wavelet decomposition: True or False

Value
- WaveletSeries - The wavelet transform of the series

References
  Journal of Wavelets, Multiresolution and Information Processing, 5, 709 to 724
  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.

Examples
```r
data<-rnorm(100,mean=100,sd=50)
WaveletFitting(ts=data,Wvlevels=3,WFilter='haar',bndry='periodic',FFlag=TRUE)
```
WaveletFittingarma

Wavelet-ARIMA hybrid model for forecasting

Description

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

Usage

WaveletFittingarma(
  ts,  
  filter = "haar",  
  Waveletlevels,  
  boundary = "periodic",  
  FastFlag = TRUE,  
  MaxARParam,  
  MaxMAParam,  
  NForecast
)

Arguments

ts univariate time series
filter Wavelet filter use in the decomposition
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

• FinalForecast - Forecasted value
• FinalPrediction - Predicted value of train data

References

Examples

\begin{verbatim}
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)
WaveletForecast <- WaveletFittingarma(ts = simts, filter = 'la8', Waveletlevels = floor(log(length(simts))), MaxARParam = 5, MaxMAParam = 5, NForecast = 5)
\end{verbatim}
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