macf {macf}

R Documentation

Moving Auto- and Cross-correlation Function

Description
The function macf computes (and by default plots) estimates of the moving auto- and cross-correlation matrix of non-stationary (and stationary) time series. Notice that the following library is needed to be installed before using the macf function: library(roll)

Usage
macf(x,w,l)

Arguments
x
a T-by-m data matrix, where the rows are "T" time points, and the columns are "m" variables
w
window width (i.e. window size) at which the macf is calculated
l
maximum lags at which the macf is calculated

Value
macf
An array of similar dimensions with lags containing the estimated macf

Note
Choosing the window width (i.e. w) is vital to enhance the results of macf to extract accurate information from the data. The size of w depends on the degree of stationarity of the data. Small window sizes are suitable for data that exhibit strong non-stationarity. For stationary data, a window of size "w=T-l" is used.

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References

Examples
#This is part of the analysis in Example 2 of Alshammri and Pan (2019).
#The data matrix X is a non-stationary time series with m=10 and T=1500.
#m=10;T=1500
# Generate x_t
X=mat.or.vec(m,T)
a1=arima.sim(list(order=c(1,1,1),ar=0.75,ma=0.9),n=T+1,sd=1)
for(i in 1:2) X[,i]=a1[i+1:T]
a2=arima.sim(list(order=c(1,1,1),ar=0.6,ma=-1.4),n=T+1,sd=1)
for(i in 3:4) X[,i]=a2[(i-1):(T+i-2)]
a3=arima.sim(list(order=c(1,1,1),ar=-0.7,ma=-2.3),n=T+1,sd=1)
for(i in 5:6) X[,i]=a3[(i-3):(T+i-4)]
a4=arima.sim(list(order=c(1,1,1),ar=-0.5,ma=0.55),n=T+1,sd=1)
for(i in 7:8) X[,i]=a4[(i-5):(T+i-6)]
a5=arima.sim(list(order=c(1,1,1),ar=0.6,ma=1.65),n=T+1,sd=1)
for(i in 9:10) X[,i]=a5[(i-7):(T+i-8)]
X=t(X)
X=ts(X)
##calculate and plot the moving auto- and cross-correlation of x with w=100 and l=20.
myresults=macf(X,100,20)
## returns the macf array
myresults

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