

Description of R codes for Comparing Time Series Part 5

This Github site contains the core algorithms of DelSole and Tippet (2023). Below is a brief description of each R code file.

TestVARXComparison.R

generates synthetic data and calls `diff.var.cycle.poly` to illustrate its application.

diff.var.cycle.poly.R

tests if two time series come from the same stochastic model, where the time series contains periodic and serially correlated components. The main relevant output is `dev.table`. There are other output variables which are used for checking purposes, but generally can be ignored. An example of the deviance table is given below:

1	> source('TestVARXComparison.R')						
2		deviance	crit(chisq)	pval(chisq)	alpha	crit(MC)	
3	D[0:1]; equal variance	3.538468	21.65667	0.9657760	0.01695243	22.28310	
4	D[1:2]; equal AR model	22.951631	30.20814	0.1150337	0.01695243	29.61645	
5	D[2:3]; equal cycle	11.788844	30.20814	0.7583831	0.01695243	30.05696	
6	D[0:3]; total	38.278942	58.12404	0.6350585	0.05000000	57.84471	

timeseries2ar.cycle.poly.R

formats y and X appropriate for $\text{VARX}(p, H)$ (called by `diff.var.cycle.poly.R`).

diff.regression.nested.mult.R

performs the nested testing procedure (called by `diff.var.cycle.poly.R`).

diagnose.var.cycle.poly.R

performs Covariance Discriminant Analysis of sub-hypotheses (called by `diff.var.cycle.poly.R`).

LjungBox.R

performs multivariate Ljung-Box test for whiteness (called by `diff.regression.nested.mult.R`).

gev.R

solves generalized eigenvalue problem.

References

DelSole, T. and M. K. Tippet, 2023: Comparing climate time series – part 5: Multivariate annual cycles. *Adv. Stat. Clim. Meteorol. Oceanogr.*, **submitted**.