

University of the Philippines

School of Statistics

Estimation of Multiple Time Series with Volatility

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Abstract

Volatility episodes in a multiple time series exert influence on the parameter estimates that will significantly reduce model fit for the non-volatile parts. Assuming a multiple time series with common autoregressive parameter, a combination of block bootstrap and forward search algorithm embedded into a backfitting algorithm was used to generate robust estimates when temporary volatility is present in the data.

Simulation studies exhibited robustness of the estimates from the hybrid algorithm. Furthermore, predictive ability of the fitted model is high during the non-volatile periods of the time series. While predictive ability deteriorates when the time series are very short or when they are nearly non-stationary, it still provides better estimates than some common modeling strategies.

Keywords: Multiple time series, volatility, modeling, bootstrap