ESTIMATION OF PERIODIC ARMA MODELS AND APPLICATION TO MOTORWAY TRAFFIC

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Abstract. In time series analysis, periodic models, where the parameters vary periodically with time, have become an attractive alternative to the traditional seasonal ones. This paper considers estimation of periodic ARMA (PARMA) models. A very short list of some significant contributions on PARMA time series estimation is Azrak and Mélard [1], Basawa and Lund [2] and Bibi and Francq [3]. In this paper, consistency and asymptotic normality of least squares estimators, as well as the limiting covariance matrix, are derived. In particular, we show that fitting a PARMA model with intercepts to the observed series can be asymptotically more efficient than fitting a PARMA model without intercepts to the mean-corrected series. Monte Carlo experiments investigate the finite sample properties of the estimators. Applications of PARMA models to a real series dealing with French motorway traffic and comparisons with seasonal ARMA models are also presented.

Keywords: Periodic ARMA models, Least squares estimators, Mean-correction, Periodic time series, French motorway traffic.

References

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