

On the Estimation of Time Series Regression Coefficients with Long Range Dependence

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Abstract

In this paper, we study parameter estimation of the multiple linear time series regression model with long memory stochastic regressors and innovations. A time-domain generalized least squares estimator is proposed, in which the inverse autocovariance matrix of the innovations is estimated via autoregressive coefficients. Theoretical properties of the proposed estimator are studied. Simulation results show the proposed estimator is comparable to frequency-domain weighted least squares estimates of Hidalgo and Robinson (2002) and attains higher efficiencies for large autoregressive or moving average coefficients. A variance reduction estimator, called the TF estimator, based on linear combination of the proposed estimator and Hidalgo and Robinson (2002)'s estimator is proposed to improve the efficiency. Bootstrap method is applied to estimate the weights of the linear combination. Simulation results show the TF estimator improves both of the frequency-domain and the time-domain approaches.

Keywords: Gauss-Markov bound; Long memory process; Multiple linear time series regression; Parameter estimation; Variance reduction.