Indirect Inference for Time Series Using the Empirical Characteristic Function and Control Variates

Abstract:
We estimate the parameter of a time series process by minimizing the integrated weighted mean squared error between the empirical and simulated characteristic function, when the true characteristic functions cannot be explicitly computed. Motivated by Indirect Inference, we use a Monte Carlo approximation of the characteristic function based on iid simulated blocks. As a classical variance reduction technique, we propose the use of control variates for reducing the variance of this Monte Carlo approximation. These two approximations yield two new estimators that are applicable to a large class of time series processes. We show consistency and asymptotic normality of the parameter estimators under strong mixing, moment conditions, and smoothness of the simulated blocks with respect to its parameter. In a simulation study we show the good performance of these new simulation based estimators, and the superiority of the control variates based estimator for Poisson driven time series of counts.

Dewey Dezimalklassifikation neu:
510 Mathematik

Zeitschriftentitel:
Preprint