

Jens-Peter Kreiß
Technische Universität Braunschweig

Abstract

Title: Extending the Validity of Frequency Domain Bootstrap Methods to General Stationary Processes

Existing frequency domain methods for bootstrapping time series have a limited range. Essentially, these procedures cover the case of linear time series with independent innovations, and some even require the time series to be Gaussian. In this paper we propose a new frequency domain bootstrap method - the hybrid periodogram bootstrap (HPB) - which is consistent for a much wider range of stationary, even nonlinear, processes and which can be applied to a large class of periodogram-based statistics. The HPB is designed to combine desirable features of different frequency domain techniques while overcoming their respective limitations. It is capable to imitate the weak dependence structure of the periodogram by invoking the concept of convolved subsampling in a novel way that is tailor-made for periodograms. We show consistency for the HPB procedure for a general class of stationary time series, ranging clearly beyond linear processes, and for spectral means and ratio statistics, on which we mainly focus. The finite sample performance of the new bootstrap procedure is illustrated via simulations.