

The Hybrid Wild Bootstrap for Time Series

Efstathios Paparoditis

We introduce a new and simple bootstrap procedure for general linear processes, called the hybrid wild bootstrap. The hybrid wild bootstrap generates frequency domain replicates of the periodogram that imitate asymptotically correct the first and second order properties of the ordinary periodogram including its weak dependence structure at different frequencies. As a consequence, the hybrid wild bootstrapped periodogram succeeds in approximating consistently the distribution of statistics that can be expressed as functionals of the periodogram, including the important class of spectral means for which all so far existing frequency domain bootstrap methods generally fail. Moreover, by inverting the wild-bootstrapped discrete Fourier transform, pseudo-observations in the time domain are obtained. The generated time domain pseudo-observations can be used to approximate correctly the random behavior of statistics the distribution of which depends on the first, second and (to some extent) on the fourth order structure of the underlying linear process. Thus, the proposed hybrid wild bootstrap procedure applied to general time series overcomes several of the limitations of standard linear, time domain bootstrap methods.

This is joint work with Jens-Peter Kreiss