

Discriminating between long-range dependence and non-stationarity

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Abstract

This paper is devoted to the discrimination between a stationary long-range dependent model and a non stationary process. We develop a nonparametric test for stationarity in the framework of locally stationary long memory processes which is based on a Kolmogorov-Smirnov type distance between the time varying spectral density and its best approximation through a stationary spectral density. We show that the test statistic converges to the same limit as in the short memory case if the (possibly time varying) long memory parameter is smaller than $1/4$ and justify why the limiting distribution is different if the long memory parameter exceeds this boundary. Concerning the latter case the novel FARI(∞) bootstrap is introduced which provides a bootstrap-based test for stationarity that only requires the long memory parameter to be smaller than $1/2$ which is the usual restriction in the framework of long-range dependent time series. We investigate the finite sample properties of our approach in a comprehensive simulation study and apply the new test to a data set containing log returns of the S&P 500.

Keywords: Empirical spectral measure, Integrated periodogram, Locally stationary process, Long Memory, Spectral density

AMS subject classifications: 62M10

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