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Testing for serial correlation of unknown form using wavelet methods. (English)

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Summary: A wavelet-based consistent test for serial correlation of unknown form is proposed. As a spatially adaptive estimation method, wavelets can effectively detect local features such as peaks and spikes in a spectral density, which can arise as a result of strong autocorrelation or seasonal or business cycle periodicities in economic and financial time series. The proposed test statistic is constructed by comparing a wavelet-based spectral density estimator and the null spectral density. It is asymptotically one-sided $N(0, 1)$ under the null hypothesis of no serial correlation and is consistent against serial correlation of unknown form. The test is expected to have better power than a kernel-based test when the true spectral density has significant spatial inhomogeneity. This is confirmed in a simulation study. Because the spectral densities of time series arising in practice usually have unknown smoothness, the wavelet-based test is a useful complement to the kernel-based test in practice.

MSC:

- 62G10 Nonparametric hypothesis testing
- 62M15 Inference from stochastic processes and spectral analysis
- 62M10 Time series, auto-correlation, regression, etc. in statistics (GARCH)
- 42C40 Nontrigonometric harmonic analysis involving wavelets and other special systems
- 62G07 Density estimation

Cited in **1** Review
Cited in **11** Documents

Keywords:

test for serial correlation; spectral density estimator

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