

Aliasing and spectral correction for locally stationary wavelet time series

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Aliasing occurs when power exists in a signal at frequencies higher than the Nyquist rate (which is determined by the sampling rate). When it occurs, aliasing causes high frequency information to wrap round and mimic power at lower frequencies.

It is all too easy to overlook aliasing when conducting an analysis of a time series. Indeed it is rarely tested for, even though a bispectrum-based test of aliasing for (stationary) time series was proposed by Hinich and Wolinsky in 1988. For locally stationary series the situation is a bit different in that aliasing can be intermittent, depending on whether the spectrum locally contains frequencies higher than the Nyquist rate or not.

This talk will introduce a wavelet-based method to separate the spectral components of a locally stationary time series into two classes: (i) aliased or white noise components and (ii) lower frequency uncontaminated components. In particular we will consider the case of Shannon wavelets which can separate components even for signals that are not band-limited.

This is joint work with Guy Nason, University of Bristol