

Discrete Estimation of Spectral Density for Alpha Stable Signals Observed with an Additive Error

Authors : R. Sabre, W. Horrigue, J. C. Simon

Abstract : This paper is interested in two difficulties encountered in practice when observing a continuous time process. The first is that we cannot observe a process over a time interval; we only take discrete observations. The second is the process frequently observed with a constant additive error. It is important to give an estimator of the spectral density of such a process taking into account the additive observation error and the choice of the discrete observation times. In this work, we propose an estimator based on the spectral smoothing of the periodogram by the polynomial Jackson kernel reducing the additive error. In order to solve the aliasing phenomenon, this estimator is constructed from observations taken at well-chosen times so as to reduce the estimator to the field where the spectral density is not zero. We show that the proposed estimator is asymptotically unbiased and consistent. Thus we obtain an estimate solving the two difficulties concerning the choice of the instants of observations of a continuous time process and the observations affected by a constant error.

Keywords : spectral density, stable processes, aliasing, periodogram

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