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Abstract

Title : "Locally Stationary Functional Time Series"

Inference methods for functional data have received a lot of attention the last few years. So far, the literature on functional time series has focused on processes of which the probabilistic law is either constant over time or constant up to its second-order structure. Especially for long stretches of data it is desirable to be able to weaken this assumption. We introduce a framework that allows for meaningful statistical inference of functional data of which the dynamics change over time. That is, we put forward the concept of local stationarity in the functional setting and establish a class of processes that have a functional time-varying spectral representation. Time-varying functional ARMA processes are investigated and shown to be functional locally stationary according to the proposed definition. Important in our context is the notion of a time-varying spectral density operator of which the properties are studied and uniqueness is derived. The framework is then used to construct an estimator of the spectral density operator based on a functional version of the segmented periodogram matrix. In particular, we prove it is consistent and study its asymptotic distribution.