Asymptotic inference for locally stationary processes

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There is a vast literature on stationary processes, in practice, however, stationarity is a strong assumption. Under the mild assumption that stationarity holds only on small intervals we arrive to the class of locally stationary processes. Models based on this class of stochastic processes have proven useful in fields such as seismology, finance, hidrology, econometrics, etc.

In this talk we present theoretical results about locally stationary Gaussian processes (LSGP) in three different areas: large deviations, Bayesian estimation and asymptotic equivalence of experiments. More precisely, we characterize the exponential decay of the Type I and Type II error probabilities of Neyman-Pearson type tests: as a consequence we obtain extensions to the so-called Stein's lemma and the Chernoff's bound. We also discuss the asymptotic normality and efficiency of Bayesian estimators with respect to a wide class of loss functions. We dedicate the final part of this talk to show that asymptotically, and with respect to Le Cam's pseudodistance, the problem of estimating parametrically the log-time-varying spectral density function of a LSGP can be thought of as a Gaussian white noise problem plus drift.