$S_t \circ c(h)(a_s)_{ti} c(s) + \mathfrak{S}_e m^i n(a_r)$

Department of Mathematics, University of Utah

Detecting changes in the mean of functional observations

Lajos Horváth
University of Utah

Time and Place: Friday January 18, 2008; 3–4 p.m.; LCB 219

Principal component analysis (PCA) has become a fundamental tool of functional data analysis. It represents the functional data as $X_i(t) = \mu(t) + \sum_{1 \le \ell < \infty} \eta_{i,\ell} \phi_\ell(t)$, where μ is the common mean, ϕ_ℓ are the eigenfunctions of the covariance operator, and the $\eta_{i,\ell}$ are the scores. Inferential procedures assume that the mean function $\mu(t)$ is the same for all values of i. If, in fact, the observations do not come from one population, but rather their mean changes at some point(s), the results of PCA are confounded by the change(s). It is therefore important to develop a methodology to test the assumption of a common functional mean. We develop such a test using quantities which can be readily computed in the `R` package `fda`. The null distribution of the test statistics is asymptotically pivotal with a well-known asymptotic distribution. The asymptotic test has excellent finite sample performance. Its application is illustrated on temperature data from Prague, England and Greenland. The talk is based on joint work with István Berkes, Robertas Gabrys and Piotr Kokoszka