Robust Functional Estimation

I. Mizera[1]

[1] University of Alberta, CAB 632, Edmonton, Alberta, T6J 0Z2, Canada

Abstract

In nonparametric regression or density estimation, the estimated object is not a point in a Euclidean space, but a more complex entity, a function—an element of possibly infinite-dimensional space. This fact makes the estimation problem more delicate and the application of classical theoretical canons less transparent. While the stability of procedures is certainly always a concern, the desideratum that seems recently more in demand is the sensitivity to qualitatively interesting features, like local extrema or discontinuities. A striking question in this context is whether such sensitivity is in conflict with robustness, or whether stability and sensitivity can be achieved simultaneously. Some old and new work related to this area will be discussed—in particular, the recent joint work with Roger Koenker on total variation regularization algorithms for nonparametric regression and density estimation.