

Detection of sparse and weak effects in high-dimensional data

Tatjana Pavlenko

KTH Royal Institute of Technology, Stockholm, Sweden

Abstract

We present a family of goodness-of-fit statistics based on sup-functionals of weighted empirical processes where weight functions are Erdős-Feller-Kolmogorov-Petrovski (EFKP) upper-class functions of a Brownian bridge. Chibisov-O'Reilly type of weight functions are also considered. In high dimensions, the sup-norms of weighted empirical processes standardized by the EFKP upper-class functions of a Brownian bridge have been recently seen to be good alternatives to the higher criticism statistic which is routinely applied in problems dealing with detection of sparse and weak effects. We show that the proposed family of statistics at hand that can be effectively used to solve a number of high-dimensional inferential problems.