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SEMINAR de « TEORIA PROBABILITATILOR, STATISTICA si APLICATII »

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«TESTING THE INFLUENCE OF COVARIATES ON RESPONSES WHEN DATA ARE CURVES»

Abstract: The problem considered is the test of the effect of a Hilbert space valued covariate on a Hilbert space valued response, that is the test of the nullity of the conditional expectation of the response given a general covariate. This general framework includes the model check problem for standard mean and quantile regressions, functional regressions, etc. against general alternatives. It also includes the problem of testing conditional independence with functional data. The significance test for (functional) regressors in nonparametric regression with general covariates and responses is another example. We propose a new test based on kernel smoothing. The test statistic is asymptotically standard normal under the null hypothesis provided the smoothing parameter tends to zero at a suitable rate. The one-sided test is consistent against any fixed alternative and detects local alternatives a la Pitman approaching the null hypothesis. In particular we show that neither the dimension of the outcome nor the dimension of the covariates influences the theoretical power of the test against such local alternatives. The uniform consistency against special classes of functions of the covariate is also studied. Simulation experiments and a real data application illustrate the performance of the new test with finite samples.

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