Significance Testing in Nonparametric Regression Based on Pairwise Distances Between Points

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In this paper, we propose a new class of test statistics to check whether some covariates are significant or not in nonparametric regression. The proposed test statistic, which is based on pairwise distances between points, has a simple and closed form. In addition, it smoothes only over the covariates appearing under the null hypothesis. It applies whether the covariates under test are continuous and/or discrete. Different from many existing methods, the convergence rate of the proposed test statistic does not depend on the dimension of the covariates under test, nor on the dimension of the covariates appearing under the null model. Simulation studies and a real data analysis are carried out to illustrate the merits of our proposed method. In small samples, our test is competitive compared to existing procedures, even for mildly large dimensions.