

**SIGNIFICANCE TESTING IN NONPARAMETRIC REGRESSION  
BASED ON THE BOOTSTRAP**

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**Abstract**

This paper proposes a test for selecting explanatory variables in nonparametric regression. The test does not need to estimate the conditional expectation function given all the variables, but only those which are significant under the null hypothesis. This feature is computationally convenient and solves, in part, the problem of the “curse of dimensionality” when selecting regressors in a nonparametric context. The proposed test statistic is based on functionals of a  $U$ -process. Contiguous alternatives, converging to the null at a rate  $n^{-\frac{1}{2}}$  can be detected. The asymptotic null distribution of the statistic depends on certain features of the data generating process, and asymptotic tests are difficult to implement except in rare circumstances. We justify the consistency of two easy to implement bootstrap tests which exhibit good level accuracy for fairly small samples, according to the reported Monte Carlo simulations. These results are also applicable to test other interesting restrictions on nonparametric curves, like partial linearity and conditional independence.