Mathematics > Statistics Theory

A two-stage hybrid procedure for estimating an inverse regression function

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We consider a two-stage procedure (TSP) for estimating an inverse regression function at a given point, where isotonic regression is used at stage one to obtain an initial estimate and a local linear approximation in the vicinity of this estimate is used at stage two. We establish that the convergence rate of the second-stage estimate can attain the parametric $n^{1/2}$ rate. Furthermore, a bootstrapped variant of TSP (BTSP) is introduced and its consistency properties studied. This variant manages to overcome the slow speed of the convergence in distribution and the estimation of the derivative of the regression function at the unknown target quantity. Finally, the finite sample performance of BTSP is studied through simulations and the method is illustrated on a data set.

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