

Quantile regression and variable selection of partial linear single-index model

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Abstract Partial linear single-index model (PLSIM) is a flexible and applicable model when investigating the underlying relationship between the response and the multivariate covariates. Most previous studies on PLSIM concentrated on mean regression, based on least square or likelihood approach. In contrast to this method, in this paper, we propose minimizing average check loss estimation (MACLE) procedure to conduct quantile regression of PLSIM. We construct an initial consistent quantile regression estimator of the parametric part base multi-dimensional kernels, and further promote the estimation efficiency to the optimal rate. We discuss the optimal bandwidth selection method and establish the asymptotic normality of the proposed MACLE estimators. Furthermore, we consider an adaptive lasso penalized variable selection method and establish its oracle property. Simulation studies with various distributed error and a real data analysis are conducted to show the promise of our proposed methods.