

Simultaneous estimation and variable selection in median regression using Lasso-type penalty

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Abstract We consider the median regression with a LASSO-type penalty term for variable selection. With the fixed number of variables in regression model, a two-stage method is proposed for simultaneous estimation and variable selection where the degree of penalty is adaptively chosen. A Bayesian information criterion type approach is proposed and used to obtain a data-driven procedure which is proved to automatically select asymptotically optimal tuning parameters. It is shown that the resultant estimator achieves the so-called oracle property. The combination of the median regression and LASSO penalty is computationally easy to implement via the standard linear programming. A random perturbation scheme can be made use of to get simple estimator of the standard error. Simulation studies are conducted to assess the finite-sample performance of the proposed method. We illustrate the methodology with a real example.

Keywords Variable selection · Median regression · Least absolute deviations · Lasso · Perturbation · Bayesian information criterion