

Instrumental variable methods in regularized regression with predictor measurement error

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Regularization methods are widely used in high-dimensional regression models and most methods are developed for the situation where all variables are correctly and precisely measured. However, in real data analysis measurement error is common. We study the variable selection and estimation problems in linear and generalized linear models when some of the predictors are measured with error. We demonstrate how measurement error impacts the selection results and propose regularized instrumental variable methods to correct for the measurement error effects. The proposed methods are consistent in selection and estimation and we derive their asymptotic distributions under general conditions. We also investigate the performances of the methods through Monte Carlo simulations and compare them with the naive method that ignores measurement error. Finally, the proposed method is applied to a real dataset. This is a joint work with Lin Xue.