先端科学技術研究科　修士論文要旨

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要旨

We propose nonconvex regularized estimators for high-dimensional truncated linear regression. Truncated linear regression is a problem wherein samples from a linear data generating process can be observed only when a response variable belongs to a specific set S; otherwise the data is removed. Daskalakis et al. recently proposed truncated-Lasso estimator, which extends the truncated regression model to the high-dimensional setting by applying the Lasso. However, it is well known that Lasso might not have promising properties in terms of sample efficiency and variable selection performance. To improve them even in the truncated setting, we propose a truncated regression model with the nonconvex penalties, in particular $L_{1/2}$ penalty and SCAD penalty. These nonconvex penalties have been shown to mitigate the drawbacks of Lasso in the standard (un-truncated) high-dimensional setting. To solve our proposed estimator, we provide an estimation algorithm combined with Local Linear Approximation and Stochastic Gradient Descent based algorithm. Theoretical results show this estimation approach is comparable with truncated-Lasso, in terms of statistical efficiency. Experimental results imply the advantages of nonconvex penalties are established even in the truncated setting.