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The de-biased group Lasso estimation for varying coefficient models

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Abstract

There has been much attention on the de-biased or de-sparsified Lasso. The Lasso is very useful in high-dimensional settings. However, it is well known that the Lasso produces biased estimators. Therefore, several authors proposed the de-biased Lasso to fix this drawback and carry out statistical inferences based on the de-biased Lasso estimators. The de-biased Lasso needs desirable estimators of high-dimensional precision matrices. Thus, the research is almost limited to linear regression models with some restrictive assumptions, generalized linear models with stringent assumptions, and the like. To our knowledge, there are a few papers on linear regression models with group structure, but no result on structured nonparametric regression models such as varying coefficient models. We apply the de-biased group Lasso to varying coefficient models and examine the theoretical properties and the effects of approximation errors involved in nonparametric regression. The results of numerical studies are also presented.

Keywords High-dimensional data · B-spline · Varying coefficient models · Group Lasso · Bias correction

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