

High-dimensional econometrics

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February 24, 2017

Recent years have seen a massive increase in the availability of large data sets. In this course we will cover some of the techniques that have been developed to analyze such data sets. Particular attention will be given to precise estimation, variable selection, and hypothesis testing. We will also see how to implement the some of the techniques in R.

Topics covered

1. The Lasso and some of its asymptotic properties when the dimension of the model is fixed. Knight and Fu [2000].
2. Introduction to the oracle property. The adaptive Lasso as an example of an estimator possessing the oracle property. Zou [2006].
3. The adaptive Lasso for instrumental variable selection. Caner and Fan [2015].
4. The adaptive elastic net for generalized method of moments. Caner and Zhang [2014].
5. Upper bounds on the estimation error in the ℓ_∞ -norm and variable selection via thresholding. Lounici [2008].
6. Finite sample oracle inequalities for the Lasso when the number of variables is larger than the sample size. Bickel et al. [2009], Bühlmann and Van De Geer [2011], Caner and Kock [2014].
7. Oracle inequalities and inference in high-dimensional VAR models. Kock and Callot [2015]. Some results from applications to large macroeconomic data sets. Callot and Kock [2014].
8. Uniformly valid inference in high-dimensional models when the number of variables is larger than the number of parameters. van de Geer et al. [2014] and Caner and Kock [2014].
9. How to use the `glmnet` and the `lars` package in R to implement Lasso-type estimators.

The recent book van de Geer [2016] may also be useful.

References

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