



THE UNIVERSITY OF CHICAGO

Department of Statistics

DISSERTATION PRESENTATION AND DEFENSE

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Tradeoffs Between Computation and Accuracy in Statistical Estimation

WEDNESDAY, July 1, 2015, at 10:00 AM
Eckhart 110, 5734 S. University Avenue

ABSTRACT

We consider the tradeoffs between statistical accuracy and computational complexity for two kinds of regularized regression. First, we consider approximating L2 regularized regression by using hard-thresholding of the sample covariance. Under appropriate conditions, the approximation will be the solution to a symmetric diagonally dominant system, solvable in nearly linear time. We analyze the predictive risk of this family of estimators as a function of the threshold and regularization parameters, deriving a family of estimators that provide a tuneable tradeoff between statistical risk and computational efficiency.

In our second setting, we consider inference and hypothesis testing for L1-penalized linear regression. Recent work has shown how this estimator can be debiased by adding a term proportional to the subgradient of L1 norm at the solution point. We propose a variant where the sample covariance is again replaced with a hard-thresholded version. We derive a computational speed-up, but this time we show that asymptotically there is no loss of power.

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