Department of Statistics

STATISTICS COLLOQUIUM

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Bayesian Gaussian Graphical Models and their extensions

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Eckhart 133, 5734 S. University Avenue
Refreshments following the seminar in Jones 111

ABSTRACT

Gaussian graphical models (GGMs) are well-established tools for probabilistic exploration of dependence structures using precision (inverse covariance) matrices. We propose a Bayesian method for estimating the precision matrix in GGMs. The method leads to a sparse and adaptively shrunk estimator of the precision matrix, and thus conduct model selection and estimation simultaneously. We extend this method in a regression setup with the presence of covariates. We consider both the linear as well as the nonlinear regressions in this GGM framework. Furthermore, to relax the assumption of the Gaussian distribution, we develop a quantile based approach for sparse estimation of graphs. We demonstrate that the resulting graph estimator is robust to outliers and applicable under general distributional assumptions. We discuss a few applications of the proposed models.

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