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Partial Correlation Estimation by Joint Sparse Regression Models

In this talk, we propose a computationally efficient approach for selecting non-zero partial correlations under the high-dimension/low-sample-size setting. This method assumes the overall sparsity of the partial correlation matrix and employs sparse regression techniques for model fitting. We illustrate the performance of our method by extensive simulation studies. It is shown that our method performs well in both non-zero partial correlation selection and the identification of hub variables, and also outperforms two existing methods. We then apply our method to a microarray breast cancer data set and identify a set of “hub genes” which may provide important insights on genetic regulatory networks. Finally, we prove that, under a set of suitable assumptions, the proposed procedure is asymptotically consistent in terms of model selection and parameter estimation.

This is joint work with Jie Peng, Pei Wang and Nengfeng Zhou.