A Stepwise Approach for High-Dimensional Gaussian Graphical Models

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Abstract

We present a stepwise approach to estimate high dimensional Gaussian graphical models. We exploit the relationship between the partial correlation coefficients and the prediction errors, and parametrize the model in terms of the Pearson correlation coefficients between the prediction errors of the nodes' best linear predictors. We propose a novel stepwise algorithm for detecting pairs of conditionally dependent variables. We compare the proposed algorithm with those of existing methods including graphical lasso (Glasso), constrained ℓ_1-minimization (CLIME) and equivalent partial correlation (EPC), via simulation studies and a real life application. In our simulation study, we consider several model settings and report the results using different performance measures that look at desirable features of the recovered graph.

Joint work with

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