Summary of discussions

October 13, 2006

General topic : Types of covariance structures that are identifiable from data

Debashis Paul When the matrix has a block diagonal covariance structure (up to some permutation of the coordinates) can we identify the different blocks ?

1. What should be the size of the blocks ?

2. What method to use to indentify ? For example, can we identify based on a few eigenvectors of the sample covariance matrix ?

3. Do we need extra assumption about the structure within individual blocks ?

4. Connection with decomposable graphical models may be explored. (Under such model, conditional on a subset of variables, called separators, can express the conditional covariance matrix of the rest as a block diagonal matrix with at least two blocks).

Young Troung Possiblity of using a canonical correlation type analysis on subsets of variables for identifying the blocks. Try to find groups with minimal canonical correlations.

Greg Rempala Possibility of using some clustering techniques, say on the eigenvectors corresponding to the largest few eigenvalues.

- When the model is described as a graphical model, Meinshausen and Bühlman (2006) proposes L_1 regression approach to identify the correct neighborhood of each variable, as long as neighborhoods are sparse. But cannot estimate the covariance consistently.

Ming Yuan In the Gaussian graphical models, a penalized likelihood criterion can consistently estimate the covariance.