Covariance Regression with Network Structure

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ABSTRACT:

In this talk, we propose a regression approach to estimate the high dimensional covariance matrix with a given network structure. Using prior information contained in the network relationships, we model the covariance as a polynomial function of the symmetric adjacency matrix. Accordingly, the problem of estimating the high dimensional covariance is converted to one of estimating low dimensional coefficients of the polynomial regression function, which we can estimate using ordinary least squares or maximum likelihood. Under mild conditions, we obtain the theoretical properties of the resulting estimators.

Simulation studies and two empirical examples illustrate the usefulness of the proposed methods.