Large Covariance Matrices Estimation

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Abstract

Covariance matrices play a central role in statistical analysis. A large collection of fundamental statistical methods require the estimation of covariance matrices. With the emergence of high dimensional data from modern technologies, estimating large scale covariance matrices as well as their inverse is becoming a crucial problem in many fields. In this talk we give a theory to unveil the precision to which covariance matrices can be estimated and to develop general methodologies for optimal estimation of the covariance matrices. It will be shown that optimal procedures under the operator norm and Frobenius norm are different. Consequently, matrix estimation is fundamentally different from vector estimation.