Optimal Estimation of a Large Covariance Matrix

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Abstract

Covariance matrices play a critical role in many areas of statistical inference. Stable and accurate covariance estimation is becoming increasingly more important in the high dimensional setting where the dimension p can be much larger than the sample size n. In this setting classical methods and results based on fixed p and large n are no longer applicable. In this talk, I will discuss some new results on optimal estimation of a large covariance matrix as well as its inverse under different settings. The results and technical analysis reveal new features that are quite different from the conventional nonparametric function estimation problems. Time permitting, I will also discuss testing of covariance structure in the high dimensional setting.