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COLLOQUIUM

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Some Hypothesis Testing Problems for High Dimensional Data under Sparsity

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10:20 a.m. - 11:10 am
Refreshments 10:00 am
C405 Wells Hall

Abstract:

Two hypothesis testing problems for high-dimensional data under sparsity will be introduced in this talk. In the first part, we consider two thresholding tests to improve the power for testing the equality of two high-dimensional mean vectors under column-wise dependence when the signal is sparse. The first thresholding test statistic is constructed based on original data and the second one is based on transformed data, which is transformed using the inverse of the linear combination of two covariance matrices. Some asymptotic and numeric results for these two tests will be presented. In the second part, we introduce a Key conFounder Controlling (KFC) estimator for estimating low-dimensional coefficients in a high-dimensional linear regression model, which is shown to be consistent and asymptotically normal. This enables us to apply the z-statistic to obtain p-value for testing the significance of each covariate. Based on the p-values, we further conduct multiple hypothesis testing by controlling the false discovery rate at a nominal level. Then, we show that the multiple hypothesis testing achieves consistent model selection. Simulation studies and empirical examples will be used to illustrate the finite sample performance of the proposed methods.

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