Seminar Series: Mathematical Statistics Seminar

Date: Thursday, March 23, 2017
Time: 3:30 – 4:20 p.m.
Location: UNIV 003

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Affiliation/Organization: Michigan State University

Nonasymptotic Analysis of Semiparametric Regression Models with High-Dimensional Parametric Coefficients

Abstract: We consider a two-step projection based Lasso procedure for estimating a partially linear regression model where the number of coefficients in the linear component can exceed the sample size and these coefficients belong to the $l_{q}$-“balls” for $q$ in $[0,1]$. Our theoretical results regarding the properties of the estimators are nonasymptotic. In particular, we establish a new non-asymptotic “oracle” result: Although the prediction error of the nonparametric projection per se has the scaling $t_{\{n\}}$ in the first step, it only contributes a scaling $t_{\{n\}}^{2}$ in the $l_{2}$-error of the second-step estimator for the linear coefficients. This new “oracle” result holds for a large family of nonparametric least squares procedures and regularized nonparametric least squares procedures for the first-step estimation and the driver behind it lies in the projection strategy. We specialize our analysis to the estimation of a semiparametric sample selection model and provide a simple method with theoretical guarantees for choosing the regularization parameter in practice.