Mathematics, Statistics, and Computer Science **@ UIC**

Statistics and Data Science Seminar

Residual Refitting Inference for High-Dimensional Linear Model

Yumou Qiu (Iowa State University)

Abstract: We study statistical inference for the effects of multiple covariates of interest simultaneously after adjusting the effects of high-dimensional control variables under a linear model. A residual refitting procedure is proposed which first obtains the residuals from fitting the response variable and the target covariates on the control covariates via regularized estimation, and then refit the residuals from the first step. Hypothesis testing and confidence interval are constructed. The proposed procedure reduces the impact of the potential over-fitting errors from regularized estimation on the inference of the target parameters. It eliminates the prediction errors in the direction of the true regression error, and hence, achieving more accurate size and higher power. Expansions of the proposed statistics are derived without a sparsity condition on the precision matrix of covariates, which show the error reduction property of the residual refitting procedure. Simulation studies and real data analysis for S&P 500 stock returns verify the theoretical results and demonstrate the proposed method has better performance than the existing methods.

Wednesday, March 2 at 4:00 PM in Zoom