Department of Applied and Computational Mathematics and Statistics Colloquium

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Confidence Intervals for Nonparametric Empirical Bayes Analysis and an Application to the Regression Discontinuity Design

In an empirical Bayes analysis, we use data from repeated sampling to imitate inferences made by an oracle Bayesian with extensive knowledge of the data-generating distribution. Existing results provide a comprehensive characterization of when and why empirical Bayes point estimates accurately recover oracle Bayes behavior. In this work, we construct flexible and practical nonparametric confidence intervals that provide asymptotic frequentist coverage of empirical Bayes estimands, such as the posterior mean and the local false sign rate. Our coverage statements hold even when estimands are only partially identified or when empirical Bayes point estimates converge very slowly. We then demonstrate how the empirical Bayes model, along with a natural exogeneity assumption, also enables estimation and inference of causal effects in the regression discontinuity design, in which treatment is determined by whether an observed running variable crosses a pre-specified threshold. Our inference is driven solely by noise-induced randomization in the running variable of the regression discontinuity design.

Mon, Dec. 13, 2021
4:30 – 5:30 PM
231 Hayes-Healy Center

Colloquium Tea – 4:00 PM in 101A Crowley Hall