Department of Statistics

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Adaptive Shrinkage with Correlated, Heteroskedastic Noise in Large-Scale Simultaneous Statistical Inference

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Jones 304, 5747 S. Ellis Avenue

ABSTRACT

Recent technological advances have brought scientists ever-growing massive data sets to perform large-scale data analysis without first formulating precisely defined hypotheses. This development poses a unique challenge in modern statistics, calling for a paradigm change in effect estimation and multiple testing, where researchers hope to extract as much information as possible from data while keeping false discoveries under control and scientific results reproducible. Many methods have been proposed to meet this challenge; however, large-scale simultaneous statistical inference is often distorted by correlation pervasive in real-world "big data." In this talk, we combine Matthew Stephens's Adaptive Shrinkage (ASH) framework and Brad Efron's Empirical Null idea to detect elusive signals and control spurious artifacts. Our approach compares favorably with cutting-edge methods and sheds new light on correlation.

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