

Mathematical Sciences

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Colloquium Series

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On improving BH procedures for high-dimensional dependent data

Abstract

In large-scale inferential settings, FDR-control is often preferred over familywise error control. This is because FDR-control is a less stringent error control procedure that improves power in high-dimensional settings. However, the validity and accuracy of any FDR-controlling procedure is essentially determined by whether the chosen test statistic is optimal, whether the null distributions are correctly or conservatively specified, and whether the data are independent across tests. In this study, we propose two procedures that provide asymptotic FDR control by incorporating a generally valid null distribution and shrinkage estimation, which improves the performance of the test statistic in certain cases, into the original procedures of Benjamini and Hochberg (1995) and Benjamini et al. (2006). Monte Carlo simulations show that the proposed procedures provide higher stability for most cases and are as powerful as, or substantially more powerful than, the alternatives in the literature.

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