



Multi-sample hypothesis testing of high-dimensional mean vectors under covariance heterogeneity

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Received: 19 December 2022 / Revised: 18 December 2023 / Accepted: 4 January 2024 /
Published online: 22 March 2024
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Abstract

In this paper, we focus on the hypothesis testing problem of the mean vectors of high-dimensional data in the multi-sample case. We propose two maximum-type statistics and apply a parametric bootstrap technique to compute the critical values. Unlike previous hypothesis testing methods that heavily depend on the structural assumptions of the unknown covariance matrix, the proposed methods accommodate a general covariance structure. Additionally, we introduce screening-based testing procedures to enhance the power of our tests. These test procedures do not require the use of approximate limiting distributions for the test statistics. Finally, we obtain and verify the theoretical properties through simulation studies.

Keywords Multi-sample hypothesis · High dimension · Parametric bootstrap · Maximum-type statistics

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