THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF APPLIED MATHEMATICS
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The Hong Kong Polytechnic University
Department of Applied Mathematics

Statistics and Data Science Online Colloquium Series

Paired or Partially Paired Two-sample Tests with Unordered Samples

By

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Abstract

In paired two-sample tests for mean equality, it is common to encounter unordered samples in which subject identities are not observed or unobservable, and it is impossible to link the measurements before and after treatment. The absence of subject identities masks the correspondence between the two samples, rendering existing methods inapplicable. In this paper, we propose two novel testing approaches. The first splits one of the two unordered samples into blocks and approximates the population mean using the average of the other sample. The second method is a variant of the first, in which subsampling is used to construct an incomplete U-statistic. Both methods are affine invariant and can readily be extended to partially paired two-sample tests with unordered samples. Asymptotic null distributions of the proposed test statistics are derived and the local powers of the tests are studied. Comprehensive simulations show that the proposed testing methods are able to maintain the correct size, and their powers are comparable to those of the oracle tests with perfect pair information. Four real examples (including a phone degradation test) are used to illustrate the proposed methods, in which we demonstrate that naive methods can yield misleading conclusions.

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Date: 27 July 2022 (Wednesday)
Time: 10:30-11:30 (Hong Kong Standard Time GMT +8)
Venue: Online Talk via Zoom (Meeting ID: 963 5246 8471)
Speaker: Dr. Zhisheng Ye, National University of Singapore
Host: Prof. Xingqiu Zhao, The Hong Kong Polytechnic University
Click to join:
https://polyu.zoom.us/j/96352468471?pwd=L2sxT1FTOWlOVlZGZkJ1d2wwN3ZyZz09

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