



A Nonparametric Multivariate Scatter-Based Ranking Method with Applications to Biomedical Research and Industrial Quality Management

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Abstract

As an extension of the multivariate location-based ranking approach proposed by Arboretti et al. (2014), we present in this work a novel nonparametric and permutation-based method for ranking of multivariate populations concerning with the scatter aspect. Besides the methodological novelty of the approach, it has a practical relevance given that there are many real problems where the need of ranking several multivariate treatments/conditions/etc. regarding an overall variability criterion is the natural goal. Finally, two real case studies in the fields of biomedical research and industrial quality management are introduced, i.e. a cytoarchitectonic study of the cerebral cortex and a search for the best storing condition in the leather industry.

Keywords: multivariate ranking problem; nonparametric combination; permutation tests.