A comparison of Rao’s score test and likelihood ratio tests for three separable covariance matrix structures

Katarzyna Filipiak¹, Daniel Klein² i Anuradha Roy³

¹Insitute of Mathematics, Poznań University of Technology, Poland
²Institute of Mathematics, P. J. Šafárik University, Košice, Slovakia
³Department of Management Science and Statistics, University of Texas at San Antonio, USA

The problem of hypotheses testing of separability of the covariance structure for two-level multivariate data using Rao’s score test (RST) statistics is studied. Three separable covariance structures are considered: (1) separability with both component unstructured, (2) separability with the first component as autoregression of order 1 (AR(1)) correlation matrix and (3) separability with the first component as compound symmetric correlation matrix. It is shown that the RST statistic does not depend on the true values of mean or unstructured separability components and, in case (3), on the true value of correlation coefficient. Monte Carlo simulations are then used to study the behavior of the null distribution of the RST statistic, in terms of sample size considerations, and for the estimation of the empirical percentiles, and compare the results with the likelihood ratio test (LRT) statistic. Both tests, RST and LRT, are implemented on a real dataset from medical studies.

This talk is partially supported by Statutory Activities No. 04/43/DSPB/0088.

References