ROBUSTNESS OF ASYMPTOTIC AND BOOTSTRAP TESTS FOR MULTIVARIATE HOMOGENEITY OF COVARIANCE MATRICES

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ABSTRACT: The present work emphasizes the importance of homogeneity covariance matrices tests of k multivariate populations, because in general it is presupposed normality, homogeneity of covariance and independence of the samples observations. Then, the assumption of covariance homogeneity violation reduces the quality of the test and the coverage probability of the confidence regions. For this reason, this work intends to evaluate through Monte Carlo simulation the performance of four tests of covariance homogeneity under normality and non-normality, for robustness, recording the type I error rates and power. The following tests were evaluated: multivariate Bartlett’s test (TBM), Samiuddin’s test, generalized for the multivariate case (TGS), and the bootstrap versions of those tests, TBMB and TGSB, respectively. Each situation for Monte Carlo simulation was a combination for the sample size (ranging from 5 to 105), the number of variates (2, 3, 5 e 10) the correlation between them (0; 0,1; 0,5 and 0,9) and the number of populations (2, 5 and 10). The results suggested that: TGS and TGSB were successfully proposed; under normality, TGS was considered superior than the tests TBM and TBMB; bootstrap tests were considered robust and superior than the asymptotic tests, controlling the type I error rate; the TGSB showed up to be more powerful than the TBMB and is recommended for testing the null of homogeneity of covariance matrices.

KEY WORDS: Simulation; Samiuddin’s test; Bayesian Inference.

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