

Abstract

Project Code: PDF/06/2543

Project Title: Powers of some one-sided multivariate tests with unknown population covariance matrix

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Project Period: 2 years.

For a multivariate normal population, Kudo (1963), Shorack (1967) and Perlman (1969) derived the likelihood ratio tests of the null hypothesis that the mean vector is zero with a one-sided alternative for a known covariance matrix, for a covariance matrix that is known up to a multiplicative constant and for an unknown covariance matrix, respectively.

Because these tests may be tedious to use, Tang, Gnecco and Geller (1989) developed approximate likelihood ratio tests and Follmann (1996) proposed one-sided modifications of the usual omnibus chi-squared test and Hotelling's T^2 test. Also, we consider a modification of Follmann's test, which adjusts for possibly unequal variances. Boyett and Shuster (1977) proposed a nonparametric one-sided test, and we use their technique to develop nonparametric versions of Perlman's test, Follmann's test, the new test and the Tang-Gnecco-Geller test. Following Chongcharoen, Singh and Wright (2002), who considered known and partially known covariance matrices, we study the powers of these one-sided tests for an unknown covariance matrix using Monte Carlo techniques and make recommendations concerning their use.

Keywords: one-sided multivariate test, Monte Carlo techniques