NEW TESTS FOR EQUALITY OF COEFFICIENTS OF VARIATION OF K NORMAL DISTRIBUTIONS

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In many scientific investigations, coefficient of variation (CV) is widely used as a measure of dispersion. They include fields like medicine, biology, climatology, business, engineering and environmental studies. CV is a relative measure of dispersion and is free from the unit of measurement and hence can be used to compare the variations in k groups or populations.
Several tests are now available for testing the equality of CV's of k populations. Most of the tests are based on the assumptions that the underlying distributions are normal. These tests are large sample tests and have an asymptotic central chi-square distribution under the null hypothesis. Fung and Tsang (1998) carried out a simulation study to compare the Likelihood Ratio (LR), modified Miller (DAD) and Squared Rank Test (SRT). They concluded that although DAD test is a very good test for normal distributions with respect to both size and power, it is not robust and has a very high type I error rates with respect to symmetric distributions with heavy tails. The SRT is robust but with a lower power compared to LRT. In another study Nairy and Rao (2003) proposed three new tests based on inverse CV's and compared the performance of tests for type I error rates and power, when the underlying distributions are normal. Their comparison included eight tests namely LRT, Wald and Score tests based on sample CV's and inverse sample CV's, Bennett's and modified Bennett test. The conclusion from this study is that Bennett, modified Bennett and Wald test based on inverse sample CV's very well maintain type I error rates while LR tests based on sample CV and inverse CV are quite liberal. This paper proposes two new tests for equality of CV's of k normal populations. Simulation is carried out to compare the twelve tests. The results indicate that the new tests NT1 and NT2 maintain type I error rates. Further Bennett's, modified Bennett, Wald test based on inverse CV, DAD test; NT1 and NT2 are fairly robust for violation of normality assumptions. The conclusions compliment the findings of Fung and Tsang (1998).