Abstract

Normality is the most important assumption of parametric statistics, especially for parameter estimation and hypothesis testing. The researcher should check whether the data have normal distribution or not by some appropriate powerful statistical tests.

The purpose of the present study is to compare the power of goodness-of-fit tests for normality based on the likelihood ratio and the non-likelihood ratio. The goodness-of-fit tests for normality are the Z_A statistic, the Z_C statistic, the Z_K statistic, the Anderson-Darling (A^2) statistic, the Shapiro-Wilk (W) statistic and the Shapiro-Francia (W') statistic, when the population distributions of this study are closed to normal distributions, symmetric long-tailed distributions, symmetric short-tailed distributions, asymmetric long-tailed distributions and asymmetric short-tailed distributions. The data set were simulated for study with three choices of sample size, 10, 50 and 100, each with 0.05 level of significance. The probability of type I error and the power of the tests were collected from 1,000 simulation in each condition.

The results of this study are as following: The probability of type I error of all 6 test statistics can be controlled for all sample sizes. In some cases of n is 50 and 100 the type I error tends to decrease when sample size is increased.

Z_A has the most power when the sample size is 10, but Shapiro-Francia (W') has the most power when the sample size is 50 and 100 for both near normal distributions and symmetric long-tailed distributions.

Z_C has the most power when the sample size is 10, Shapiro-Wilk (W) has the most power when the sample size is 50, and Z_A has the most power when the sample size is 100 for the case of symmetric short-tailed distributions.

Z_A has the most power when the sample size is 10, 50 and 100 for the case of asymmetric long-tailed distributions.

Z_C has the most power when the sample size is 10, but Z_A has the most power when the sample size is 50 and 100 for the case of asymmetric short-tailed distributions.