

## Abstract

The objectives of this research are to compare 3 methods of the lack of fit test in linear regression model without replication; the methods are Draper and Smith, Su and Yang and Miller and Neill. The methods are to be compared by considering the ability to control the probability of type I error and the power of the test. We consider only the case of one independent variable and the random error has a standard normal distribution. Type I error is computed when the straight line model( $Y = \beta_0 + \beta_1 X + \varepsilon$ ) is the true model and the power of the test is computed when the assumed true models that are used to generate the data are polynomial of degree 2 and 3, trigonometric model 1, trigonometric model 2, and exponential model. The sizes of samples are 15, 50, and 100. The test is based on 0.05 level of significance. The required clustering for Draper and Smith method and Su and Yang method are determined by function cutree with equal sample size in each cluster. For Miller and Neill method, the data are arranged in clusters of sizes 2, 3, 4, 5

The results of the study indicate that the 3 methods have ability to control probability of type I error in all cases. The Draper and Smith method is more efficient than the Su and Yang method and Miller and Neill method in most of the cases. In every procedures, power of the test increases according to the size of sample. When the regression coefficient increases, the power of the test increases and the power of the test will stay constant when the regression coefficient reaches certain level. When we consider the number of groups, it is found that Draper and Smith method and Su and Yang method have the constant power of the test or the power of the test decreases when the number of groups increases.