

C623620 : MAJOR STATISTICS

KEY WORD: WEIGHTED LEAST SQUARE / MODIFIED DELETE-ONE JACKKNIFE / DELETE-GROUP JACKKNIFE

PAIROT KHAWSITHIWONG : A COMPARISON ON THE POWER OF THE TEST STATISTICS

FOR REGRESSION COEFFICIENTS OF HETEROSCEDASTIC LINEAR MODELS. THESIS

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The purpose of this research is to compare the power of the test statistics : weighted least square method (t_W), modified delete-one jackknife method (t_M) and delete-group jackknife method (t_J), for testing regression coefficients of heteroscedastic linear regression models with replication. The two criterions employed for the comparison are the ability to control probability of type I error and power of the test under the linear regression models with the number of independent variables of 1, 3, the number of levels of independent variables of 6, 9, 15 and the studies include the case of equal and unequal replication at 0.01, 0.05 and 0.10 significant levels. The distribution of the errors are multivariate normal distribution where the errors have 9 type of heterogeneity in the variance patterns and both case of errors are uncorrelated and correlated within level of independent variables. The data of this experiment are generated through the Monte Carlo simulation technique with 500 repetitions in each situation. The results of this research can be concluded as follow :

1. Probability of type I error

When errors within level of independent variables are uncorrelated, the test statistic t_W and t_M cannot control probability of type I, if heterogeneity of variance between level of independent variables are high and replication within level of independent variables are small. When errors within level of independent variables are correlated, the test statistic t_W and t_M can control probability of type I, if errors within level of independent variables are low-correlated. When errors within level of independent variables are uncorrelated and correlated, the test statistic t_J can control probability of type I. The ability to control probability type I error of the test statistic t_J will decrease as difference of replication between level of independent of variables increases.

2. Power of the test

In most cases, the test statistic t_W is more powerful than t_M when errors within level of independent variables are uncorrelated and low-correlated. When errors within level of independent variables are uncorrelated. The test statistic t_W and t_M are more powerful than t_J , if replication within level of independent variables are large. When errors within level of independent variables are low-correlated, the test statistic t_J is more powerful than t_W and t_M if heterogeneity of variance between level of independent variables are high and replication within level of independent variables are small. When errors within level of independent variables are moderate-correlated and high-correlated, the test statistic t_J is the most powerful of all the test statistics.

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