

## Abstract

The objective of this study is to compare model selection criterion for Multiple Linear Regression Model. The General Multiple Linear Regression Model is shown as follow.

$$Y = X\beta + e$$

where  $Y$  is a  $nx1$  vector of dependent variable,  $X$  is a  $nxp$  matrix of independent variables,  $\beta$  is an  $px1$  unknown parametric vector of regression coefficients,  $e$  is a  $nx1$  random vector of error and  $e \sim N(0, \sigma^2 I_n)$ ,  $I_n$  is an  $nxn$  identity matrix,  $n$  is the number of observed data. Model Selection Criteria for this research are Model Selection Criterion using adjusted Akaike Information Criterion by approximating Kullback Leibler Information for reduced Risk Function or  $AIC_{ri}$ , Model Selection Criterion using developed  $AIC_C$  Criterion by Kullback's Symmetric Divergence or  $KIC_C$ , Model Selection Criterion using developed  $AIC_I$  Criterion by Kullback's Symmetric Divergence or  $KIC_I$ , Cross-Validation for small sample sizes or  $G_n^{CV}$  using  $C_n^{(R)}$ , The Partial F-test Statistic using Stepwise Regression. Define  $\alpha=3/4$  and  $\varepsilon=2/5$  in  $AIC_{ri}$  Criterion. The criteria employed for the comparison are The Average of Mean Square Error (AMSE) and The Ratio of Different Average of Mean Square Error (RDAMSE). In this study, the data is simulated by S-plus 2000 Computer Program. The number of independent variables are 3, 6, 9 and 12. The error is normally distribution with mean 0 and standard deviation equals to 1, 5 and 10. The sample size based on the number of independent variables. In this study, we simulate data 500 times. The simulation data satisfy the assumption in Multiple Linear Regression Analysis. The results of the study are as follows:

In the case of small sample sizes:  $AIC_{ri}$  and Stepwise Regression methods are the best model selections comparing to  $KIC_C$ ,  $KIC_I$  and  $G_n^{CV}$  using  $C_n^{(R)}$  methods.  $KIC_I$  method is a better than  $KIC_C$  method.

In the case of moderate sample sizes:  $AIC_{ri}$  and Stepwise Regression methods are the best model selections and have the same result. Which also similar to  $KIC_C$  method.  $KIC_C$  method is a better than  $KIC_I$  method.

In the case of large sample sizes:  $AIC_{ri}$  , Stepwise Regression ,  $KIC_C$  and  $KIC_I$  methods give the same or similar results.