MANOON SRIVIRAT : A COMPARISON OF METHODS FOR ESTIMATION OF PARAMETERS BETWEEN LEAST SQUARE METHOD AND BOOTSTRAP METHOD IN ANALYSIS OF COVARIANCE. THESIS ADVISOR : ASSO.PROF. THEERAPORN VERATHAWORN, Ph.D. 198 PP. ISBN 974-581-118-1

The objective of this thesis is to study and compare the efficiency of methods for estimation of parameters between Least Square method and Bootstrap method in the analysis of covariance by making study and comparison of the ability in controlling probability of type I error and power of the test of two methods when the distribution of errors are in the form of longer tail than normal, namely, the logistic, double exponential and scale-contaminated normal of scale factor equals to 3,10 and percent of contamination equals to 5,10 and 25. The variance of error equals to 100,400 and the level of significance equals to 0.01 and 0.05. This research used the number of covariate equals to 1,3,5 as the number of treatment equal to 3, sample size used in each treatment equals to 6,8,10,12 and the number of treatment equals to 5,7,sample size used in each treatment equals to 4,6,8. As the various types of data used in this experiment are simulated with computer program using Monte Carlo technique, repeating 1,000 times in each case. The results of this study are as follows:

1. Probability of type I error

Both methods could control the probability of type I error completely in all cases when the distribution of error is in logistic and double exponential type. But both methods could not control the probability of type I error completely in all cases when the distribution of error is of scale-contaminated normal type. Both methods could control probability of type I error better when the level of significance and number of covariate have higher value.

2. Power of the test

a) The distribution of error is scale-contaminated normal type. For every value of number of treatment studied. Bootstrap method gives higher power of the test than Least Square method when the sample size in each treatment has low value regardless of the number of covariate, scale factor and percent of contamination studied. However, Bootstrap method gives lower power of the test than Least Square method when the sample size in each treatment has higher value as the number of covariate, scale factor and percent of contamination has low value whereas the increase in scale factor results in the decrease of value of power of the test of both methods lower than the increase in percent of contamination.

b) The distribution of error is double exponential type. In general, it was found that Bootstrap method would give higher power of the test than Least Square method regardless of the number of treatment, number of covariate and sample size in each treatment studied.

c) The distribution of error is logistic type. In general, it was found that for every number of treatment studied, Bootstrap method gives higher power of the test than Least Square method when the sample size in each treatment has low value regardless of the number of covariate studied. However, Bootstrap method gives lower power of the test than Least Square method when sample size in each treatment has higher value as the number of covariate has low value.

In every distribution of error studied, the power of the test of Bootstrap method varies according to the variance of error and the power of the test of the two methods varies according to sample size in each treatment and the level of significance. But the power of the test of the two methods varies inversely the number of covariate.