Chitlada Chumphutong 2009: Comparison of the Statistical Methods for the Analysis of Repeated Measures Designs. Master of Science (Statistics), Major Field: Statistics, Department of Statistics. Thesis Advisor: Associate Professor Ananchai Khuantham, M.S. 128 pages.

The objective of this study was to compare four statistical methods for the analysis of repeated measures designs, i.e. conventional F, adjusted degrees of freedom F, multivariate analysis of variance (MANOVA) and multi-level modeling methods (MLM). Both sphericity and asphericity covariance matrix of which treatments were 4, 6, 8 treatments (r), 10 subjects (n), with variance equal to 1 and 20, three levels of correlation coefficient which were low level ($\rho = 0.3$), moderate level ($\rho = 0.6$), high level ($\rho = 0.9$) and level of significance 0.01, 0.05 were studied by simulating data of each situation by Monte Carlo Simulation 1,000 times via the consideration of power of the test and the ability to control type I error. The study was divided into two parts as follows:

1. The comparison of power of the test when variance was low (1) which meant that power of the test of each method was not different and when variance was large (20) at different correlation coefficient and treatment, analysis methods provided different power of the test.

2. For type I error, when variance was low (1), Only multi-level modeling method could control type I error and when variance was large (20), adjusted degrees of freedom F and multi-level modeling method could control type I error.

Therefore, from this study it was found that multi-level modeling method had high power of the test and could control Type I error for both sphericity and asphericity covariance matrix.

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