COMPARISON BETWEEN *r-k* AND *r-d* CLASS ESTIMATORS IN THE PRESENCE OF AUTOCORRELATED ERRORS IN LINEAR REGRESSION MODEL

P.M.O.P. Panahatipola[1,2] **and S.P. Abeysundara**[1,3*]

[1]*Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka*
[2]*Depaertment of Mathematical Sciences, Wayamba University of Sri Lanka, Kuliyapitiya, Sri Lanka*
[3]*Department of Statistics & Computer Science, University of Peradeniya, Peradeniya, Sri Lanka*
[*]*sachitha@pdn.ac.lk*

Multicollinearity and autocorrelated errors have adverse effects on the properties of the least-squares estimator in linear regression. Several bias estimators were suggested by the researchers to reduce the effect of multicollinearity in place of the best linear unbiased estimator and Ordinary Least Square (OLS) Estimator. The intension of this study was to compare the performance of such two bias estimators, *r-d* class and *r-k* class estimators, using a Monte-Carlo simulation, when the problem of multicollinearity and autocorrelated errors occur simultaneously. Four different values for the autocorrelation parameter ρ (0.1, 0.3, 0.7 and 0.9), and eight different levels for noise parameter σ (0.01, 0.1, 0.25, 0.5, 1, 4, 9 and 20), were selected. Nine different values (0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8 and 0.9) were selected for the bias parameters of the two estimators (k/d) with the sample size of 30. Results show that the *r-k* class estimator performs better than the *r-d* class estimator in the sense of Mean Square Error (MSE) when ρ, σ and k/d are not substantial. Considering the effect of ρ, it was the same for the two estimators considered when the error variance $\sigma \geq 0.5$. On the other hand, the $r-d$ class estimator is superior to *r-k* class estimator when $k/d \leq 0.4$, and the $r-k$ class estimator is superior to the other estimator when $k/d > 0.4$ for large values of σ and ρ. Simulation results indicate that no estimator is always superior to the other estimator when the multicollinearity and autocorrelation occur simultaneously.

Keywords: Autocorrelation, Mean Square Error, Multicollinearity, *r-d* class estimator, *r-k* class estimator