Abstract

The concept of different forms on the basis of original, minimum, maximum and measures of locations of eigen values of $X'X$ of the design matrix in regression analysis was introduced into estimating the biasing or ridge parameter of the generalized ridge estimator of linear regression model with multicollinearity problem. This resulted into some proposed biasing parameters having considered existing seven (7) biasing parameters of the Generalized Ridge Regression (GRR) estimator. Their performances were examined and compared with the Ordinary Least Square (OLS) estimator and the existing (parent / original) biasing parameters of GGR estimator so as to identify the one(s) that would produce efficient estimates of the model parameters. Monte Carlo experiments were conducted 5000 times on two linear regression models with three and six explanatory ($p = 3$ and $p = 6$) variables under six (6) levels of multicollinearity ($\rho = 0.8, 0.9, 0.95, 0.99, 0.999, 0.9999$), three (3) levels of standard error ($\sigma = 1, 5$ and 10) and seven (7) levels of sample sizes ($n = 10, 20, 30, 50, 100, 150, 250$). The estimators were compared using Mean Square Error (MSE) criterion.
Results showed that the proposed different forms biasing parameters frequently perform more efficiently than the parent form; and that the different form of minimum of eigen values of $X^T X$ using the generalized ridge parameter of Batach et al. (2008) often produces efficient estimates of linear regression parameter with multicollinearity problem.

References


Index Terms

Computer Science

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Keywords

Different Forms Biasing parameter, Ordinary Least Square Estimator, Generalized Ridge Regression Estimator, Mean Square Error