A simulation study for alternative estimation technique in nonlinear models with multicollinear data

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Abstract

Nonlinear regression models have a wide use in the most of applied sciences such as chemistry, biology, agriculture. So the estimation procedure in nonlinear models is very important. A method widely used in computer algorithms for nonlinear regression is The Gauss-Newton method that uses a Taylor series expansion to approximate the nonlinear regression model with linear terms and then employs ordinary least squares to estimate the parameters. Unfortunately while this method is being employed, the multicollinearity problem is omitted. This usually causes misleading or erroneous inferences. Based on our best knowledge coming from literature survey, this problem has not been analyzed efficiently. S.H. Ngo, S. Kemény, A. Deák (2003) examined into the problem briefly by way of a simulation. The aim of this study is to introduce a new approach to estimate nonlinear regression model in case multicollinearity exists on Jacobian matrix. Finally the performance of our estimation technique will be analyzed using simulation study.

Keywords

Multicollinearity, Nonlinear regression, Iterative ridge regression, Mean squared error.

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