

Method of Newton and Gauss-Newton in the estimation of parameters of nonlinear regression model

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Abstract: In several areas of knowledge it is common to evaluate the possible relationship between a dependent variable and one or more independent variables. This study can be done through regression models that are divided basically into two distinct classes: linear and nonlinear. In the estimation of the parameters in regression models it is usual to use the least squares method, which for the nonlinear case the system of equations does not present an explicit solution and iterative methods are needed to have the solution. The objective of this work was to compare the Newton and Gauss-Newton iterative methods in the fit of the Stanford and Smith model. The data analyzed were carbon mineralization of oat straw in the soil over time. The Gauss-Newton method, which is specific for estimating nonlinear model parameters, was more efficient than Newton's method for estimating the parameters of the Stanford and Smith model fitted to the data. The Gauss-Newton method is implemented in software for parameter estimation of nonlinear regression models.

Keywords: least squares method, iterative methods, Stanford and Smith model.

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