

ISOTONIC REGRESSION APPLIED TO GROWTH CURVE STUDIES

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- **ABSTRACT:** *Non-linear regression Models have proved to be adequate to describe growth curves of domestic animals of zootechnical interest, since they have parameters which can be interpreted from a biological point of view. These models are adjusted to weight-age data by means of iterative algorithms such as Gauss-Newton. A problem often reported is a non convergence of this algorithm in the presence of oscillations in the expected path of the curve; it is widely characterized by an abrupt weight loss of animals due to the influence of environmental effects such as the lack of forage (nutrients) and / or the presence of diseases. Thus, it is necessary to develop estimation procedures that address this fact, and that somehow, they consider the expected response naturalness in the experiments. The aim of this study was to propose a methodology for processing data via isotonic regression analysis for studies of growth curves whose data have disorders characterized by decreased body weight at certain ages. Besides investigating the efficacy of the method based on isotonic regression in relation to increased convergence and the quality of the adjustment of the model. It was also intended to propose an interactive isotonization procedure whose aim was to obtain an optimal transformation for the data. All mentioned methods were evaluated using a Monte Carlo simulation study. Through the simulation study data it was verified that the adopted isotonization methodologies resulted in higher percentages of convergence and smaller mean squared errors (MSE) for the parameters of the Logistic models, Gompertz and Von Bertalanffy.*
- **KEYWORDS:** Isotonic regression; nonlinear model; growth curve.

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