



## **Evaluation of the parameter estimators behavior in a nonlinear model with misspecified random effects distribution**

María del Carmen Garcia

*Institute of Theoretical and Applied Research, School of Statistics. National University of Rosario. Argentina— [mgarcia@fcecon.unr.edu.ar](mailto:mgarcia@fcecon.unr.edu.ar)*

Cecilia Rapelli

*Institute of Theoretical and Applied Research, School of Statistics. National University of Rosario. Argentina— [cecirapelli@hotmail.com](mailto:cecirapelli@hotmail.com)*

Mara Lis Catalano\*

*Institute of Theoretical and Applied Research, School of Statistics. National University of Rosario. Argentina— [catalano@fceia.unr.edu.ar](mailto:catalano@fceia.unr.edu.ar)*

Noelia Castellana

*Institute of Theoretical and Applied Research, School of Statistics. National University of Rosario. Argentina— [noecastellana@hotmail.com](mailto:noecastellana@hotmail.com)*

### **Abstract**

Nonlinear mixed models provide a framework for analysis longitudinal data within a large number of applications. To characterize the population variation, these models express the individual specific parameters in terms of fixed and random effects, and to consider the correlation between repeated measurements introduce intra unit errors. A basic assumption for the random effects is the normal distribution. This assumption is often not met and its compliance is difficult to verify with standard statistical tools. The methods for estimating these models are based on the normality assumption. In this paper, through simulations, we present a preliminary investigation of the impact of misspecifying the random effects distribution on the fixed effects estimation and the random effects prediction. Data are generated according to a specified model in which the random effects have not Gaussian distribution and analyzed assuming that the normality assumption is met. For the random effects are considered three distributions, normal, t-Student and multivariate Gamma. Results allow a better understanding of the consequences of violating the estimation procedure assumptions, but cannot draw general conclusions.

**Keywords:** nonlinear mixed models; random effects; no Normality.