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One-way classification with random effects: A reversed-hazard-based approach

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Abstract

This paper deals with the one-way classification analysis on the basis of conditional proportional reversed hazard rate models when treatment effects are random. Characteristics of the response variable including reversed hazard function, mean, variance and intraclass correlation are derived in explicit expressions. Estimations of the proposed model parameters are also obtained. Best predictions for score effects are given. The proposed model is an alternative approach for one-way classifications in which generalized linear models are applied for analysing continuous responses. For illustrative purposes, a real data set is analysed using the obtained results.

Keywords: Non-linear modeling; One-way classification; Random effects; Estimation; Exponential distribution.
2010 MSC: 62-07; 62F10

1. Introduction

One-way classification, known as one-way analysis of variance (ANOVA), is a widely used method in data analyses. This method examines the effect of a grouping (categorical or factor) variable on the mean of a continuous response variable. Usually, the one-way ANOVA can be used as a fixed effects or random effects model. In a fixed effects model, data has been gathered from all the levels of the factor that are of interest. But in a random effects model, the factor has many possible levels and only a random sample of levels is included (observed) in the data; See, e.g., McCulloch et al. [1]. Moreover, the random effects ANOVA is more applicable than

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