

The Zero-Modified Poisson-Lindley Regression Model

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Abstract

In this paper we propose the zero-modified Poisson-Lindley regression model as an alternative to model overdispersed count data exhibiting inflation or deflation of zeros in the presence of covariates. Will be shown that the zero modification can be incorporated by using the zero-truncated Poisson-Lindley distribution. A simple reparametrization of the probability function will allow us to represent the zero-modified Poisson-Lindley distribution as a hurdle model. This lead to the fact that proposed model can be fitted without any previously information about the zero modification present in a given dataset. Bayesian procedures will be considered for estimation and inference concerns. A sensitivity study to detect points which can influence the parameter estimates will be performed based on the Kullback-Leibler divergence. A simulation study is presented in order to illustrate the performance of the developed methodology. The usefulness of the proposed model will be evaluated using a real dataset of faecal egg counts of gastrointestinal nematodes from 282 cows. Standard comparison respect to the Poisson, Poisson-Lindley and zero-modified Poisson regression models is also provided.

Keywords: Poisson-Lindley distribution, zero-modified data, hurdle models, Bayesian estimation.