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THE DISCRETE NEW XLINDLEY DISTRIBUTION: A STATISTICAL FRAMEWORK FOR MODELLING MEDICAL AND BIOLOGICAL SCIENCE DATA

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Abstract *Modelling the frequency of events is a significant problem that has received a lot of attention in recent years. Discrete probability distributions such as the Poisson, Negative Binomial, Geometric, and Poisson-Lindley are commonly used for this purpose. However, these traditional distributions often exhibit limited flexibility in capturing the complexity of real-world count data. In this regard, we study the New Discrete XLindley distribution introduced by (Maya et al., 2024) and discussed its various structural properties. A Bayesian analysis is conducted to enhance the inferential understanding of the model. To address the presence of excess zeros in count data, we propose a zero-inflated extension of the New Discrete XLindley model. Parameters are estimated using the Maximum Likelihood Estimation method, and the performance of the estimators is assessed via simulation studies. The practical relevance of the proposed model is demonstrated through its application to a real-life dataset. Finally, a Likelihood Ratio Test is employed to test the significance of the zero-inflation parameter, providing strong evidence in support of the extended model. Overall, the zero-inflated New Discrete XLindley model offers a flexible and effective tool for modeling zero-inflated count data.*

Keywords: *Bayesian COVID-19 Simulation XLindley Zero-Inflation.*

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