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DISCRETE INVERSE WEIBULL BETA MODEL: PROPERTIES AND APPLICATIONS IN HEALTH SCIENCE

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ABSTRACT

The study deals with introducing a new discrete probability model which is obtained by compounding two parameter discrete inverse Weibull distribution [12] with Beta distribution of first kind. Structural properties of the distribution such as its unimodality, hazard rate behavior and index of dispersion are discussed. Model parameters are estimated by ML estimation method followed by Monte Carlo simulation procedure. Finally, a real data set is analyzed to investigate the suitability of the proposed model in modeling discrete data from health science.

KEYWORDS

Discrete Inverse Weibull Distribution, Monte Carlo simulation, Beta distribution, Hospital Stay Data.

1. INTRODUCTION

Probability models are commonly applied to describe real world phenomena. Due to the usefulness of probability models, their theory is widely studied and new distributions are developed [14,15]. Recently, there has been an increased interest in developing new probability models using compounding technique. Compound distributions are very flexible and can be used efficiently to model different types of data sets. Many probability distributions have been constructed by researchers using the technique of compounding. Dubey [4] studied a compound gamma, beta and F distribution by compounding a gamma distribution with another gamma distribution and reduced it to the beta first and second kind and to the F distribution by suitable transformations. Sankaran [18] studied a compound of PD (Poisson distribution) with that of LD (Lindley distribution) for modeling count data. Many compound distributions were proposed by Gerstenkorn [7,8], he studied compound of GD (gamma distribution) with ED (exponential distribution) by considering the parameter of GD (gamma distribution) as an exponential random variate and also he introduced compound of PD (Polya distribution) with BD (Beta distribution). Ghitany, Al-Mutairi and Nadarajah [9,10] proposed ZTPLD (zero truncated Poisson-Lindley distribution), the distribution was suitable for modeling count data in the case where the distribution has to be adjusted for the count of missing zeros. A new compound distribution was introduced by Zamani and Ismail [20] by compounding NBD (negative binomial distribution) with one parameter LD (Lindley

