

On Three Parameter Discrete Generalized Inverse Weibull Distribution: Properties and Applications

Bilal Ahmad Para¹ · Tariq Rashid Jan¹

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Abstract

In this paper, a new discrete version of generalized inverse Weibull distribution is proposed using the general approach of discretization. Structural properties of the newly introduced discrete model have been discussed comprehensively. Characterization results have also been made to establish a direct link between the discrete generalized inverse Weibull distribution and its continuous counterpart. Various theorems relating a generalized inverse Weibull distribution with other probability models have also been proved. Finally, a real life count data set from medical sciences is used to illustrate the application of discrete inverse Weibull distribution.

Keywords Discrete generalized inverse Weibull distribution \cdot Medical sciences \cdot Count data \cdot Monte Carlo simulation \cdot Index of dispersion

1 Introduction

Discretized probability models form a basic and promising field of study in the domain of survival analysis to handle discrete lifetime data and also count data sets in a wide variety of disciplines such as medical sciences, engineering, agriculture and so on. Since most of the lifetimes have continuous nature and hence many continuous lifetime probability models have been studied in statistical literature (Kapur and Lamberson [1], Lawless [2] and Sinha [3]). However, in life testing experiments, sometimes it is inconvenient or impossible to measure the life length of a patient, device or a component on a continuous scale. Some disease in a patient, equipment or a piece of equipment operates in cycles and experimenter observes the number of cycles successfully completed prior to failure. For example, life length of a copier would

 ☑ Bilal Ahmad Para parabilal@gmail.com
Tariq Rashid Jan

drtrjan@gmail.com

¹ Department of Statistics, University of Kashmir, Hazratbal, Srinagar, India