## **DISCRETIZATION OF BURR-TYPE III DISTRIBUTION**

**B.A.Para<sup>1</sup>** and **T.R.Jan<sup>2</sup>** 

Department of Statistics, University of Kashmir, Srinagar, J&K (India) E Mail: <sup>1</sup>parabilal@gmail.com, <sup>2</sup>drtrjan@gmail.com

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## Abstract

In this paper we propose a discrete analogue of Burr-type III distribution using a general approach of Discretizing a continuous distribution. It may be worth exploring the possibility of developing a discrete version of two parameter Burr-type III distribution, so that same can be used for modeling a discrete data. Discrete Burr-type III distribution is suggested as a suitable reliability model to fit a range of discrete life time data, as it is shown that hazard rate function can attain monotonic increasing (decreasing) shape for certain values of parameters. The equivalence of discrete Burr-type III (DBD-III) and continuous Burr-type III (BD-III) distributions has been established. Various theorems relating Burr Type III distribution with other statistical distributions have also been proved.

Key Words: Burr-Type III Distribution, Discrete Lifetime Models, Reliability, Failure Rate.

## 1. Introduction

In reliability theory a plethora of continuous life models is now available in the subject to portray the survival behavior of a component or a system. Many continuous life distributions have been studied in details (see for example Kapur and Lamberson (1997), Lawless (1982) and Sinha (1986). However, it is sometimes impossible or inconvenient in life testing experiments to measure the life length of a device on a continuous scale. E.g. the lifetime of an on/off switching device is a discrete random variable, or life length of a device receiving a number of shocks it sustain before it fails is also a discrete random variable. In the recent past special roles of discrete distribution are getting recognition from survival analysts. Many continuous distributions have been discretised, e.g. the Geometric and Negative binomial distributions are the discrete versions of Exponential and Gamma distributions. Nakagawa (1975) discretised the Weibull distribution. The discrete versions of the normal and rayleigh distributions were also proposed by Dilip Roy (2003,2004). Discrete analogues of maxwell, two parameter Burr XII and Pareto distributions were also proposed by Krishna and punder (2007,2009). Recently inverse Weibull distribution were also discretised by Mansour Aghababaei Jazi, Chin-Diew lai and Mohammad Hussein Alamatsaz (2010).

The present paper deals with the problem of discretization of Burr-type III (BD-III) distribution, as there is a need to find more plausible discrete life time distributions to fit to various life time data.