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Discrete Generalized Burr-Type XII Distribution

B. A. Para University of Kashmir Srinagar, India **T. R. Jan** University of Kashmir Srinagar, India

A discrete analogue of generalized Burr-type XII distribution is introduced using a general approach of discretizing a continuous distribution. It may be worth exploring the possibility of developing a discrete version of the six parameter generalized Burr-type XII distribution for use in modeling a discrete data. This distribution is suggested as a suitable reliability model to fit a range of discrete lifetime data, as it is shown that hazard rate function can attain monotonic increasing (deceasing) shape for certain values of parameters. The equivalence of discrete generalized Burr-type XII (DGBD-XII) and continuous generalized Burr-type XII (GBD-XII) distributions has been established. The increasing failure rate property in the discrete setup has been ensured. Various theorems relating this new model to other probability distributions have also been proved.

Keywords: Discrete generalized Burr-type XII distribution, discrete lifetime models, reliability, failure rate

Introduction

In reliability theory a number 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 & Lamberson, 1997; Lawless, 1982; 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. For example 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.

Recently, the special roles of discrete distributions have received recognition from survival analysts. Many continuous distributions have been discretized. For example, the Geometric and Negative binomial distributions are the discrete

B. A. Para is a Research Scholar in the Department of Statistics. Email him parabilal@gmail.com. T. R. Jan is an Assistant Professor in the Post-Graduate Department of Statistics. Email him at drtrjan@gmail.com.