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A NEW GENERALIZATION OF ISHITA DISTRIBUTION: PROPERTIES AND APPLICATIONS

Anwar Hassan, Showkat Ahmad Dar and Bilal Ahmad Para

Department of Statistics, University of Kashmir, Jammu and Kashmir, India

Department of Statistics, Government Degree College Boys Anantnag, Jammu and Kashmir, India

Email: anwar.hassan2007@gmail.com, darshowkat2429@gmail.com, parabilal@gmail.com

Abstract

The concept of weighted distributions can be employed in the development of proper models for lifetime data. In this paper, we introduce a new generalization of Ishita distribution called as Weighted Ishita Distribution (WID). The statistical properties of this distribution are derived and the model parameters are estimated by maximum likelihood estimation. Finally, an application to real data set is presented.

Keywords and phrases: Ishita Distribution; Weighting Technique; Structural Properties and Maximum Likelihood Estimation.

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1 Introduction

Ishita distribution is a newly proposed lifetime model formulated by Shanker and Shukla (2017) for several engineering applications and calculated its various characteristics including stochastic ordering, moments, order statistics, Renyi entropy, Stress-Strength reliability and ML estimation.Analyzing and modeling real lifetime data are crucial in many applied sciences including medicine, engineering, insurance and finance, amongst others. The two important one parameter lifetime distributions namely exponential and Lindley are popular for modeling lifetime data from biomedical science and engineering. The new one parameter lifetime distribution called as Ishita distribution has better flexibility in handling lifetime data as compared to exponential and Lindley distribution.

Probability density function (pdf) of Ishita Distribution (ID) is given by

$$f(x\,;\,\theta)=\frac{\theta^3}{\theta^3+2}(\theta+x^2)e^{-\theta\,x},\qquad x>0,\,\theta>0. \tag{1.1}$$