ON A NEW SKEW GENERALIZED LOGISTIC DISTRIBUTION

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Dedicated to Prof. M.A. Pathan on his 75th birth anniversary

Abstract: In this paper, we propose a new skew generalized logistic distribution, which is an extension of the logistic distribution, the generalized logistic distribution, proposed by Rathie and Swamee [11] and the Kumaraswamy Logistic distribution, proposed by Santana et al. [13]. We study various mathematical properties of the new distribution, including explicit formulas for the probability density function, cumulative distribution function, survival, hazard and quantile functions. We also derive formulas for the moments, mean and median deviations, the Lorenz and Bonferroni curves. We also study some statistical properties, such as distributions of the minimum and the maximum order statistics. This distribution is used in two applications with real data: the first data is bimodal, and the second unimodal.

Keywords: Generalized logistic distribution, hazard rate function, Kumaraswamy distribution, maximum likelihood estimation, survival function.

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1. Introduction

The cumulative distribution function given by Kumaraswamy [6] is

$$G(x) = 1 - (1 - x^\alpha)^\beta, \ \ 0 < x < 1, \tag{1}$$

where $\alpha, \beta > 0$. The probability density corresponding to (1) is given by

$$g(x) = \alpha\beta x^{\alpha-1}(1 - x^\alpha)^{\beta-1}, \ \ 0 < x < 1, \tag{2}$$