HALF CAUCHY GENERALIZED RAYLEIGH DISTRIBUTION: THEORY AND APPLICATION

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Abstract: We develop a new three parameter distribution using the half-Cauchy family of distributions, called the half-Cauchy generalized Rayleigh distribution. Some statistical properties and characteristics of the proposed distribution are provided and obtained, including the explicit expressions for the survival function, median, hazard function, mode, moments, mean deviation, order statistics, cumulative hazard function, quantiles, and the measures of dispersion based on quartiles and octiles. For the parameter estimation of the proposed model, three widely used estimation techniques namely, maximum likelihood estimators (MLE), Cramer-Von-Mises (CVM), and least-square estimation (LSE) methods are applied. Two real datasets are used for the illustration, and the goodness-of-fit test is run. It is discovered that the proposed model fits the real data very well and is more flexible than some well-known models under consideration.

Keywords and Phrases: Generalized Rayleigh distribution, Failure rate average, Half-Cauchy distribution, Order statistics, Moment.

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1. Introduction

There are numerous continuous probability distributions found in probability theory and applied statistics literature. Some application areas, like environmental, actuarial, and medical sciences, economics, life sciences, demography, finance,