

## TOPP-LEONE POWER RAYLEIGH DISTRIBUTION WITH PROPERTIES AND APPLICATION IN ENGINEERING SCIENCE

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## Abstract

Standard distributions do not essentially have a reasonable fit to all kinds of data sets, implying the need to make generalisations of standard distributions in order to improve their usefulness in data modelling. In this paper, we developed a new generalization of power Rayleigh distribution by employing the Topp-Leone generated family of distributions. The distribution which has been developed is known as the Topp-Leone power distribution (TLPRD). The distinct structural properties of the formulated distribution including moments, moment generating function, incomplete moments, order statistics, different measure of entropies, mean deviations have been discussed. In addition expressions for survival function, hazard rate function, reverse hazard rate function and mean residual function are obtained explicitly. The behaviour of probability density function (pdf) and cumulative distribution function (cdf) are illustrated through different graphs. The estimation of the established distribution parameters are performed by maximum likelihood estimation method. A simulation analysis has been carried out to evaluate and compare the effectiveness of estimators in terms of their bias, variance and mean square error (MSE). Eventually the versatility of the established distribution is examined through real life data set related to engineering science.

## 1. Introduction

Probability distributions are useful for inferring statistical inferences and interpreting data. These findings may be used to make some well-informed

2010 Mathematics Subject Classification: 60E05, 62FXX, 62F10, 62G05.

Received May 19, 2021; Accepted August 13, 2021

Keywords: Topp-Leone distribution, power Rayleigh distribution, moments, Renyi entropy, simulation, maximum likelihood estimation.