

The Exponentiated Generalized Rayleigh Distribution

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Abstract—The Rayleigh distribution can be applied in applications like life testing experiments and clinical studies. Surles and Padgett (2001) introduced two-parameter Burr Type X distribution, also called as generalized Rayleigh distribution. It is observed that this particular skewed distribution can be used quite effectively in analysing lifetime data. In this paper, we introduce a new model of generalized Rayleigh distribution called as Exponentiated generalized Rayleigh (EGR) distribution. The Exponentiated Generalized family of distributions is an extension of the Exponentiated type distribution which can be widely applied in many areas of biology and engineering; see Cordeiro et al (2013) for details. It has been used to define the Exponentiated Generalized Inverse Weibull distribution, Elbatal and Muhammed (2014), Exponentiated Generalized Inverse Exponential distribution, Oguntunde et al. (2014) and Exponentiated Generalized Gumbel distribution, Andrade et al (2015).

In this paper, we derive the different structural properties like moments, the moment generating function and the information matrix. The parameters of the proposed distribution have been estimated through the method of maximum likelihood estimation. A simulation study is presented to explain how the Exponentiated Rayleigh distribution performs better than other its sub-distributions.

Keywords: Exponentiated distribution, generalized Rayleigh distribution, Maximum likelihood estimation, AIC, BIC.