

Exponentiated Generalized Geometric Burr III Distribution

Suleman Nasiru^{1*}, Peter N. Mwita², Oscar Ngesa³

¹Pan African University, Institute for Basic Sciences,
Technology and Innovation.

P.O. Box 62000-00200, Nairobi, Kenya.

Corresponding author's email: sulemanstat@gmail.com/snasiru@uds.edu.gh

Corresponding author's phone: 0792916430

²Machakos University, Department of Mathematics.

P.O. Box 136-90100, Machakos, Kenya.

Email: petermwita@mksu.ac.ke

³Taita Taveta University, Mathematics and Informatics Department.

P.O. Box 635-80300, Voi, Kenya.

Email: oscanges@ttu.ac.ke

ABSTRACT

Statistical distributions play a major role in parametric statistical modeling and inference. However, most of the existing classical distributions do not provide reasonable parametric fits to data sets. Thus, the need to develop generalized versions of these classical distributions has become an issue of interest to many researchers in the field of distribution theory. This study proposes a new generalization of the Burr III distribution called the exponentiated generalized geometric Burr III distribution. Various statistical properties of the distribution such as the quantile function, moment, moment generating function, incomplete moment, mean residual life, entropy, reliability, stochastic orders and order statistics were derived. The method of maximum likelihood estimation was employed to estimate the parameters of the distribution and simulation studies were performed to investigate the properties of the estimators for the parameters of the distribution. The simulation results revealed that the estimators for the parameters were stable as the root mean square error approaches zero as the sample size increases. Application of the distribution was demonstrated using real data set to show its usefulness.

Keywords: Burr III, geometric, quantile function, stochastic orders, order statistics, entropy