

WEIGHTED ARZ DISTRIBUTION: PROPERTIES AND APPLICATION

RODAINA M. AL-AYASRAH

Department of Mathematics, Al al-Bayt University, Mafraq (25113), Jordan

MOHAMMED M. GHARAIBEH

Department of Mathematics, Al al-Bayt University, Mafraq (25113), Jordan

Email: mmgharaibeh@gmail.com

SUMMARY

In this paper, a new continuous distribution with one parameter named weighted Arz distribution (WAD) is suggested using the idea of weighted distributions. Several properties of this distribution such as moments, moment generating function, skewness, coefficient of variation, kurtosis, and index of dispersion are investigated. Also, the distribution of order statistics, Lorenz and Bonferroni curves, Gini index, stochastic ordering, Rényi entropy, mean deviations about mean and median are provided. The reliability functions including survival, hazard, odds, reversed hazard rate, and mean residual life are provided with supported graphical representation. The maximum likelihood estimate (MLE) of the distribution parameter is provided. A simulation study is conducted to show the consistency of the MLE. Application to COVID-19 data set is presented and showed that the proposed distribution is more flexible than some other competing distributions in fitting such data.

Keywords and phrases: Weighted distributions, Reliability analysis, Moments, Order statistics, Stochastic ordering, Entropy, Mean deviations, Maximum likelihood estimation.

2020 Mathematics Subject Classification: Primary 62E10, secondary 60E05.