Journal of Applied Probability and Statistics
2022, Vol. 17, No. 2, pp. 093-122

MODIFIED TOPP-LEONE-CHEN DISTRIBUTION: PROPERTIES AND ESTIMATION BASED ON PROGRESSIVE TYPE-II CENSORING SCHEME

N. T., AL-SAYED, E. M., SWIELUM, G. R., AL-DAYIAN, AND A. A., EL-HELBAWY*

Statistics Department, Faculty of Commerce
AL-Azhar University (Girls'Branch), Cairo, Egypt
Email: aah_elhelbawy@hotmail.com

SUMMARY

In recent years, composite models based on Topp-Leone distribution have become popular in actuarial sciences and related areas. On the other hand the modeling and analysis of lifetimes are important aspects of statistical work in a wide variety of scientific and technological fields. In this paper, a modified Topp-Leone Chen distribution is introduced and studied as a composite distribution. Some properties of the proposed distribution are obtained. The maximum likelihood method is used under progressive Type-II censored samples for estimating the model parameters, reliability and hazard rate functions. A numerical example is given to investigate the precision of the maximum likelihood estimates and an application using real data set is used to demonstrate how the results can be used in practice.

*Keywords and phrases:*Topp-Leone distribution; Chen distribution; progressive Type-II censored samples; maximum likelihood method; asymptotic Fisher information matrix.

2020 Mathematics Subject Classification: 62H05, 62N05, 62F10.