ON THE LINEAR COMBINATION OF N LOGISTIC RANDOM VARIABLES AND RELIABILITY ANALYSIS

L. C. de S. M. Ozelim[1], C.E. G. Otiniano[2] and P. N. Rathie[3]

Department of Civil and Environmental Engineering,
University of Brasilia, Brasilia- DF, 70910-900, Brazil.
E-mail: luanoz@gmail.com

[2]Department of Statistics,
University of Brasilia, Brasilia- DF, 70910-900, Brazil

[3]Department of Statistics and Applied Mathematics,
Federal University of Ceara, Fortaleza- CE, 60440-900, Brazil

Dedicated to Prof. A.M. Mathai on his 80th birth anniversary

Abstract: Logistic distributions have been widely applied to model data in both pure and applied sciences. In the present paper, the probability density and cumulative distribution functions of the linear combination of N independent and not identically distributed logistic random variables have been obtained in terms of the H-function. By means of the latter, reliability measures of the type $P(\sum_{i=1}^{N_1} X_i < \sum_{j=1}^{N_2} Y_j)$, when X_i, $i = 1, ..., N_1$ and Y_j, $j = 1, ..., N_2$ are logistic random variables have been derived. Also, a highly accurate approximated expression has been built for the case $N_1 = N_2 = 1$ by means of curve fitting techniques, avoiding the need for H-function calculations in this case. Numerical experiments have been carried out, revealing that the expressions proposed correctly predicted the reliability measures considered.

Keywords and Phrases: logistic distribution; linear combination; reliability analysis.

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