

ON THE GENERALIZED GAMMA-GENERATED
DISTRIBUTIONS AND APPLICATIONS

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Dedicated to Prof. K. Srinivasa Rao on his 75th Birth Anniversary

Abstract: In this paper, we propose two new generalized gamma-generated distributions with any base distribution. In particular, we obtain the generalized gamma-generated exponential Weibull distribution (GG-EW) and generalized gamma-generated Dagum distribution (GG-Dagum). We study some mathematical properties of the new distributions, including explicit formulas for the probability density function, cumulative distribution function, by using Gauss' hypergeometric and Meijer G functions. It is shown, in general, that the generalized gamma-generated distributions are infinite linear combinations of the powers of the base distribution. Incorrect results given earlier by other authors are pointed out. We applied the distributions in the following data sets: (a) spending on public education in various countries in 2003 and (b) total expenditure on health in 2009 in various countries. The results show that the distributions fit well the data sets. The general R codes for fitting the distributions introduced in this paper are given in Appendix.

Keywords and Phrases: Exponentiated Weibull distribution, Dagum distribution, gamma-generated distribution, special functions.

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1. Introduction

In this section, we give two known distributions which will be used later on. The