Estimation methods for Kumaraswamy exponential distribution applied survival data

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Abstract

In the literature, several known distributions are used to accommodate data of failure times, however, most of these distributions is not able to accommodate not monotonous failure rates. Kumaraswamy [1] proposed a new probability distribution able to accommodate these rates and, based on it, most recently Cordeiro and de Castro [2] proposed a new family of generalized distributions, the Kumaraswamy generalized (Kum-G). This distribution besides being flexible, contains distributions with unimodal and bathtub-shaped hazard functions, as shown by de Pascoa et al. [3]. In this paper, we present the Kumaraswamy exponential (Kum-Exp) distribution to analyze data on the lifetime of individuals at risk, and this model is a particular case of the family of Kum-G distributions. Some properties of this distribution will be presented as well as the appropriate method of estimation for the model parameters, the classic and Bayesian approach. The new distribution is illustrated with two data sets in the literature and a simulation study is done to verify the frequentist properties.