



E-Bayesian estimation for the Burr type XII model based on type-2 censoring

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ARTICLE INFO

Article history:

Received 8 November 2010

Received in revised form 21 March 2011

Accepted 31 March 2011

Available online 19 April 2011

Keywords:

Burr type XII

E-Bayes

Type-2 censoring

Monte Carlo simulation

ABSTRACT

This paper is concerned with using the E-Bayesian method [M. Han, Applied Mathematical Modeling (2009) 1915–1922] for computing estimates for the parameter and reliability function of the Burr type XII distribution based on type-2 censored samples. The estimates are obtained based on squared error and LINEX loss functions. A comparison between the new method and the corresponding Bayes and maximum likelihood techniques is made using the Monte Carlo simulation.

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1. Introduction

The two-parameter Burr type XII ($Burr(\alpha, \beta)$) distribution with probability density function (*pdf*)

$$f(x) = \alpha\beta x^{\alpha-1} (1 + x^\alpha)^{-(\beta+1)}, \quad x > 0, \quad (\alpha > 0, \beta > 0), \quad (1.1)$$

and the reliability function

$$R(t) = (1 + t^\alpha)^{-\beta}, \quad t > 0, \quad (1.2)$$

was first introduced in literature by Burr [1]. The $Burr(\alpha, \beta)$ distribution has been proposed as a lifetime model by Rodriguez [2] and Tadikamalla [3]. Lewis [4] proposed the use of the $Burr(\alpha, \beta)$ distribution as a model in accelerated life test data representing times to breakdown of an insulating fluid. Inferences and predictions for the $Burr(\alpha, \beta)$ distribution and some of its testing measures based on complete and censored samples were discussed by many authors. Evans and Ragab [5] obtained Bayes estimates of β and the reliability function based on type-2 censored samples. AL-Hussaini and Jaheen [6,7] obtained Bayesian estimation for the two parameters, reliability and failure rate functions of the Burr XII distribution. Ali Mousa [8] obtained empirical Bayes estimation of the parameter β and the reliability function based on accelerated type-2 censored data. Based on complete samples, Moore and Papadopoulos [9] obtained Bayes estimates of β and the reliability function when the parameter α is assumed to be known. Ali Mousa and Jaheen [10] obtained Bayes approximate estimates for the two parameters and reliability function of the $Burr(\alpha, \beta)$ distribution based on progressive type-2 censored samples. Jaheen [11] used the generalized order statistics for obtaining Bayesian inference for the Burr XII model. Based on progressive samples from the $Burr(\alpha, \beta)$ distribution, Soliman [12] obtained the Bayes estimates using both the symmetric (squared error) loss function, and asymmetric (LINEX, General Entropy) loss functions.

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