Ann. Inst. Statist. Math.
Vol. 55, No. 2, 319–330 (2003)

EXACT LIKELIHOOD INFERENCE BASED ON TYPE-I AND TYPE-II HYBRID CENSORED SAMPLES FROM THE EXPONENTIAL DISTRIBUTION

A. CHILDS[1], B. CHANDRASEKAR[2], N. BALAKRISHNAN[1] AND D. KUNDU[3]

[1]*Department of Mathematics and Statistics, McMaster University, Hamilton, Ontario, Canada L8S 4K1*
[2]*Department of Statistics, Loyola College, Chennai 600 034, India*
[3]*Department of Mathematics, Indian Institute of Technology Kanpur, Kanpur 208016, India*

(Received August 7, 2001; revised March 18, 2002)

Abstract. Chen and Bhattacharyya (1988, *Comm. Statist. Theory Methods*, **17**, 1857–1870) derived the exact distribution of the maximum likelihood estimator of the mean of an exponential distribution and an exact lower confidence bound for the mean based on a hybrid censored sample. In this paper, an alternative simple form for the distribution is obtained and is shown to be equivalent to that of Chen and Bhattacharyya (1988). Noting that this scheme, which would guarantee the experiment to terminate by a fixed time T, may result in few failures, we propose a new hybrid censoring scheme which guarantees at least a fixed number of failures in a life testing experiment. The exact distribution of the MLE as well as an exact lower confidence bound for the mean is also obtained for this case. Finally, three examples are presented to illustrate all the results developed here.

Key words and phrases: Type-I and Type-II hybrid censoring, exponential distribution, order statistics, confidence bound, life testing.