

CONFIDENCE BOUNDS FOR THE EXPONENTIAL MEAN
IN TIME-TRUNCATED LIFE TESTS

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1. Introduction

A commonly occurring life-test situation is: a time T is specified, n units are put on test without replacement and the successive ordered times-to-failure $X_1 \leq \dots \leq X_r < T$, $r \leq n$, are observed. This life testing procedure is commonly referred to as Type 1 censoring, which will be assumed throughout this paper.

Here we suppose that each of the n units tested has the same one-parameter exponential life-time distribution of which the mean is θ . Computing methods will be developed for the lower confidence bound on θ based on the maximum-likelihood estimate (MLE).

The MLE, say $\hat{\theta}$, has been given by Halperin (1950), Bartlett (1953a,b), Deemer and Votaw (1955) and Bartholomew (1957):

$$(1) \quad \hat{\theta} = \left[\sum_{i=1}^r X_i + (n-r)T \right] / r, \quad r \geq 1 .$$