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Presents

Exact Inference for a Simple Exponential Step-stress Model Under Type-I Hybrid Censoring Scheme

by

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In reliability and life-testing experiments, the researcher is often interested in the effects of extreme or varying stress factors such as temperature, voltage and load on the lifetimes of experimental units. Step-stress test, which is a special class of accelerated life-tests, allows the experimenter to increase the stress levels at fixed times during the experiment in order to obtain information on the parameters of the life distributions more quickly than under normal operating conditions. In this paper, we consider the simple step-stress model under the exponential distribution when the available data are Type-I hybrid censored. We derive the maximum likelihood estimators (MLEs) of the parameters assuming a cumulative exposure model with lifetimes being exponentially distributed. The exact distributions of the MLEs of parameters are obtained through the use of conditional moment generating functions. We also derive confidence intervals for the parameters using these exact distributions, asymptotic distributions of the MLEs and the parametric bootstrap methods, and assess their performance through a Monte Carlo simulation study. Finally, we present two examples to illustrate all the methods of inference discussed here.

In this talk, I will briefly introduce the literature background of reliability and life-testing procedure along with the corresponding step-stress problem, and then present an advanced topic in Type-I (hybrid) censoring scheme. After that, I apply the Type-I hybrid censoring scheme to the observed data which follow a simple exponential step-stress model. Finally, I derive the exact inference for the corresponding unknown parameters based on the maximum likelihood estimation and conditional moment generating function.

Refreshments will be served before the talk in AX24A