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Bayesian Designs for Progressively Type-I Censored Simple Step-Stress Accelerated Life Tests Under Cost Constraint and Order-Restriction

Tuesday, 14 September 2021 17:45 (20 minutes)

In this work, we investigate order-restricted Bayesian cost constrained design optimization for progressively Type-I censored simple step-stress accelerated life tests with exponential lifetimes under continuous inspections. Previously we showed that using a three-parameter gamma distribution as a conditional prior ensures order restriction for parameter estimation and that the conjugate-like structure provides computational simplicity. Adding on to our Bayesian design work, we explore incorporating a cost constraint to various criteria based on Shannon information gain and the posterior variance-covariance matrix. We derive the formula for expected termination time and expected total cost and propose estimation procedures for each. We conclude with results and a comparison of the efficiencies for the constrained vs. unconstrained tests from an application of these methods to a solar lighting device dataset.

Keywords

accelerated life tests; Bayesian analysis; step-stress loading

Special/invited session

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