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Inference for the Progressively Type-I Censored K -Level Step-Stress Accelerated Life Tests Under Interval Monitoring with the Lifetimes from a Log-Location-Scale Family

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As the field of reliability engineering continues to grow and adapt with time, accelerated life tests (ALT) have progressed from luxury to necessity. ALT subjects test units to higher stress levels than normal conditions, thereby generating more failure data in a shorter time period. In this work, we study a progressively Type-I censored k -level step-stress ALT under interval monitoring. In practice, the financial and technical barriers to ascertaining precise failure times of test units could be insurmountable, therefore, it is often practical to collect failure counts at specific points in time during ALT. Here, the latent failure times are assumed to have a log-location-scale distribution as the observed lifetimes may follow Weibull or log-normal distributions, which are members of the log-location-scale family. Here, we develop the inferential methods for the step-stress ALT under the general log-location-scale family, assuming that the location parameter is linearly linked to the stress level. The methods are illustrated using three popular lifetime distributions: Weibull, lognormal and log-logistic.

Keywords

accelerated life tests; interval monitoring; log-location-scale family

Special/invited session

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