Reliability Indicators for Substantiation of Multi-Stress Test Plans with Weibull Behavior

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Abstract: In Weibull Test planning, the efficiency of the designed plan depends on the total experimental time, which in turns depends on the design time (t_d) and on the sample size (n) to be tested. Since a demonstration test plan is designed without failures, the binomial parametric approach for a specific confidence level, by considering the failure probability to be constant, is used to estimate n. In particular under time or operational restrictions, the extended life approach is used to make a trade-off between n and the experimental time. Unfortunately since these approaches neither uses the time variable nor the risk due the environmental factors, which in turn determine the reliability indexes generally the designed plans are suboptimal. Thus in this paper by the use of a Weibull-Poisson process, the risk in each Poisson arrival is accessed, and by combining both, the arrival and the risk, the reliability indexes are estimated. In order to present the efficiency of the method, a numerical application is given.

Keywords: Weibull Distribution, Test Plans, Hazard Rate Function, Lipson Equality