

Optimal measurement time planning for gamma degradation tests

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Abstract

Degradation tests are widely used in industry to evaluate the reliability of products by assessing their quality characteristics. Due to the product's mechanism, the degradation path typically exhibits a monotonic property, employing a monotonic stochastic process, such as the gamma process, is reasonable for data fitting. To enhance the efficiency and accuracy of product reliability assessments, several studies have addressed the optimal design problem of gamma degradation tests. Most of them assume the measurement time intervals are equal which is a practical and common assumption for engineers. In this talk, I will show that the equal measurement time intervals plan is, in fact, the worst-case scenario. Furthermore, an optimal design does not exist. To address this issue, practical assumptions are introduced to ensure the tractability of the optimal design, which, under certain circumstances, may align with equal measurement time intervals.