

高可靠度產品的壽命估計及最佳加速衰變實驗設計

The Estimation of Lifetime and Optimal Accelerated Degradation Test for High Reliable Products

李名鏞

靜宜大學資料科學暨大數據分析與應用學系

Abstract

For many highly reliability products, it might still be difficult to obtain enough failure data with short test duration even if an accelerated lifetime test is used. Without observing failures, it is not easy to assess the reliability of products. Therefore, a degradation test or an accelerated degradation test (ADT) can be used as alternative approaches to estimate product lifetime.

In a (accelerated) degradation test, the product's life is assumed to be highly related to some quality characteristics (QC), which would degenerate as time passes. Therefore, how to collect the degradation data and how to analysis the data are important problem. In this talk, I will divide it into two parts to introduce my work in recent years.

In the estimation of reliability, I am going to provide several data collection methods and their parameter estimation. In the optimal ADT design, budget constraint is used in the traditional ADT design (Tseng and Liao (2006), Tseng, Balakrishnan, and Tsai (2009)) to obtain the optimal ADT design under given stress levels. Such design cannot predict the accuracy of estimate and the choice of accelerating stress is also a very important issue. Therefore, in this talk, I will provide an optimal design under controlling margin of error (MOE) base on Wiener process. Furthermore, it will generalize this result to a broader integration model: exponential-dispersion degradation models. Finally, I will describe my current main work and future research.

Keywords: Reliability, Accelerated Lifetime Test, Accelerated Degradation Test, Margin of Error, Estimation Accuracy, Winer process, Exponential-Dispersion Degradation Models.