敬請公告

東海大學統計學系學術演講

時　間：115 年 5 月 5 日（星期二下午 14:10~15:00）

地　點：管理學院新大樓 M242

主講人：李名鏞 教授兼系主任

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講　題：Lifetime Distribution and Model Parameters Inference Using Intermediate Data Under Time-Censoring

Abstract

High-reliability products often fail to exhibit observable failures within practical test durations, making lifetime estimation challenging. To address this, Tang and Su (2008) proposed using intermediate first-passage times to multiple non-failure thresholds as surrogate lifetime information. However, in modern reliability studies, even intermediate degradation paths may be censored due to limited test time. We extend their framework by (i) developing the likelihood for time-censored intermediate data under a Wiener degradation process, and (ii) proposing an alternative method that treats intermediate measurements as exact degradation levels and models the corresponding times as censored observations. For m non-failure thresholds, we derive the joint distributions across the m+1 possible censoring scenarios and obtain maximum likelihood estimators via numerical optimization. Simulation studies show that using multiple intermediate thresholds substantially reduces estimation variance. The first-passage–based method remains nearly unbiased under moderate censoring, whereas the degradation-value method tends to underestimate lifetime as censoring increases. A real high-power LED dataset demonstrates the practical performance of both approaches.

Key words and phrases: Reliability, intermediate data, lifetime distribution, nonfailure threshold, time censored, degradation analysis, high power LED.

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