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Decision Procedure of Lifetime Performance Assessment of Rayleigh Products under Progressively Type II Right Censored Samples

Chin-Chuan Wu, Li-Ching Chen and Yi-Jie Chen
Tamkang University

Abstract

Process capability analysis is an effective method of assessing process performance and potential capability. The lifetime performance index is a popular quantitative method to determine whether product quality meets a specific level. This study constructs statistical methods of assessing the lifetime performance of products with Rayleigh distribution under progressively type II right censored samples. The maximum likelihood estimator of the lifetime performance index is inferred by the technique of data transformation. A hypothesis testing procedure and the corresponding confidence interval are then developed to assess products performance under a given lower specification limit. The Monte Carlo simulations are conducted to assess the behavior of these procedures. An example is used to illustrate the implementation of the proposed testing procedure.

Keywords: Lifetime performance index, maximum likelihood estimator, process capability analysis, progressively type II right censored sample, Rayleigh distribution.