Reliability-based Measures of a System with an Unreliable Repairman with Geometric Reneging Under Threshold-based Recovery Policy

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Abstract

This study investigates a repairable system with \( M \) identical operating units, \( S \) standby units, and an unreliable repairman. An unreliable repairman means that the repairman is subject to unpredictable breakdowns and operates the threshold-based recovery policy. When the repairman breaks down, the repairman can not be repaired immediately until that the number of failed units in the system reaches a specified threshold value \( Q \) (\( 0 < Q < S \)). When the repairman is busy or broken down, the failed unit may conduct abandonments after an exponentially distributed length of time. During the abandonment period, failed units are considered one by one sequentially rather than simultaneously. For this system, we first establish the differential equations by means of Markov process theory. Then the Laplace transforms technique was used to develop the reliability function and the mean time to system failure. Finally, numerical results are presented to illustrate the impacts of various system parameters on the reliability characteristics.

Keywords
Geometric reneging, reliability analysis, threshold-based recovery policy

Biography


Zong-Ru Wu received his M.S. degree in Institute of Information and Decision Sciences at National Taipei College of Business, Taiwan. His research interests include queueing theory and reliability analysis.

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