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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 ($0 \le Q \le S$). 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

Dong-Yuh Yang is an assistant professor in Institute of Information and Decision Sciences at National Taipei College of Business, Taiwan. He received his Ph.D. in industrial engineering and management from National Chiao Tung University, Taiwan, and M.S. in applied mathematics from National Chung Hsing University, Taiwan. His research interests include applied statistics, process capability analysis, fuzzy theory, and queueing theory. He has published a number of papers in international journals such as *Journal of Computational and Applied Mathematics*, *Journal of Manufacturing Systems*, *International Journal of Systems Science*, *Journal of the Chinese Institute of Industrial Engineers*, *Expert Systems with Applications*, *Engineering Computations*, *International Journal of Computer Mathematics*, *Central European Journal of Operations Research*, *Communications in Statistics - Simulation and Computation*, *Journal of Testing and Evaluation*, and *Applied Mathematics and Computation*.

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