

Transient Analysis of a Repairable Single Server Queue with Working Vacations and System Disasters

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Abstract

This study investigates the repairable single server queue with working vacations and system disasters. The server allows to take a working vacation if there is no any customers in the system. There is a possibility of breakdowns happening in a system. When the system occurs server breakdowns, the server goes to the failure state and all customers in the queue are flushed away. The repairing process starts immediately, when the server comes to the failure state. The explicit expression for system size probabilities of the queueing system is derived in terms of the modified Bessel function of first kind using the probability generating function method, Laplace transform and continued fractions. Additionally, the mean and variance for number of jobs in the system at time t are derived as the performance measures. Finally, a numerical example is presented to study the behavior of the system.

Keywords

M/M/1 queue Repairable server Working vacations System disasters

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