Steady State Analysis of Two $M^X/M^{a,b}/1$ Queue Models with Random Breakdowns

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Abstract

We study two models of a single server bulk queueing system $M^X/M^{a,b}/1$ in which the service facility suffers time homogeneous random breakdowns from time to time. In model A, the repair times are assumed to be exponential and in model B, the repair times are assumed to be detrministic. We obtain the probability generating functions of the queue size and the system size, the average queue size, the average system size and the average waiting time in the queue and the system. Some particular cases of interest are discussed and some known results are derived as special cases. A numerical example is also provided.

Keywords: Two Model of $M^X/M^{a,b}/1$ Queueing System with Batch Arrivals, Batch Service, Random Breakdowns, Exponential/Deterministic Repairs, Steady State Analysis.