M/G/1 Feedback Queue with Two Stage Heterogeneous Service with Time Homogeneous Breakdowns and Deterministic Repair Times

S. Vanitha

SSN College of Engineering

Abstract

We analyze a single server feedback queue with Poisson arrivals, two stages of heterogeneous service with different (arbitrary) service time distributions subject to random breakdowns and just after a breakdown the server undergoes repairs of a fixed (constant) duration. After first-stage service, the server must provide the second stage service. However after the completion of second stage of service, if the customer is dissatisfied with his service, he can immediately join the tail of the queue as a feedback customer with probability $p.$ Otherwise the customer may depart forever from the system with probability $q = 1 - p.$ The supplementary variable technique is employed to find explicitly the probability generating function of the number in the system and the mean number in the system. Some particular cases of interest are discussed as special cases.

Keywords: Poisson arrivals, idle state, steady state, deterministic repairs, supplementary variable technique.