

Steady State Analysis of an M/D/1 Queue with Coxian-2 Server Vacations and a Single Vacation Policy

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Abstract

We analyze the steady state behavior of an M/D/1 queue with Bernoulli schedules and Coxian-2 server vacations. Customers arrive one by one at the system in a Poisson stream. The service time of a customer is assumed to be deterministic. At each service completion epoch, the server may opt to take a vacation with probability P or else with probability $1-P$ may continue to be available in the system for the next service. The vacation period of the server is assumed to have a Coxian-2 distribution. We obtain steady state probability generating functions for the queue size and the system size in explicit and closed forms. Some particular cases of interest including known results of the M/D/1 queue have been derived.

Keywords: Bernoulli Schedule Server Vacations, Deterministic Service, Coxian-2 Server Vacations, Steady State Probability Generating Functions, Stability Condition.