Abstract

In this paper, we develop and analyze an interdependent forked queueing model with state dependent service times. Here, it is assumed that the arrival and service processes are correlated and follow a multivariate Poisson process. Using the difference-differential equations, the joint probability generating function of the number of customers in each queue is
Transient Analysis of an Interdependent Forked Tandem Queuing Model with Load Dependent Service Rate

derived. The system performance like the average number of customers in each queue, the average waiting time of a customer, the throughput of each service station, the idleness of the servers are derived explicitly. The sensitivity analysis of the model reveals that the dependency parameter and state dependent service rates can reduce congestion in queues and average waiting time of the customer. This model also includes some of the earlier models as particular cases for specific values of the parameters. The forked queueing models are much useful for analyzing and monitoring several communication networks and production processes.

Reference


Index Terms

Computer Science
Communications
Key words
Forked Queueing Model
Poisson Process
Multivariate
Transient analysis
Performance measures