Abstract

Consider a single server fixed batch service queueing system under multiple vacation with gated service in which the arrival rate $\lambda$ follows a Poisson process and the service time follows an exponential distribution with parameter $\mu$. Assume that the system initially contains $k$ customers when the server enters into the system and starts the service immediately in batch of size $k$. After completion of a service, if the server finds less than $k$ customers in the queue, then the server goes for a multiple vacation of length $W$. If there are more than $k$ customers in the queue, the first $k$ customers will be selected from the queue and service will be given as a batch. Gated type service policy is adopted in this model that is once the server starts service for a batch of $k$ customers, no customers will be allowed to enter into the queue. Every time a service is finished, and there are less than $k$ customers in the queue, the server leaves for a vacation of length $W$. This model is completely solved by constructing the generating function and Rouche's theorem is applied and we have derived the closed form solutions for probability of number of customers in the queue during the server busy and in vacation. Further we are providing the closed form solutions for mean number of customers in the queue, variance and various system performance measures of the system. Numerical studies have
been done for analysis of system measures for various values of ?, µ, ? and k.

References

- Doshi, B. T., 1986, Queueing systems with vacations- A survey Queueing Systems 1, 29-66.
Analysis of Single Server Fixed Batch Service Queueing System under Multiple Vacations with Gated Service

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