A Controllable Bulk Service Queueing System with Accessible and Non-Accessible Batches

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Abstract

A controllable bulk service queueing system with two servers, where the server-I allows accessibility to the batches of ongoing service, is considered in this article. The arrival process is assumed to be Poisson and the service rule is as follows: when the system size is less than or equal to the control limit b_1 then server-I is busy and he serves them altogether in a batch, incorporating accessibility to the batches while the service is on progress and if the system size is more than b_1 then both the servers (server-I and server-II) are busy, where server-I serves b_1 units in a batch and from the remaining server-II serves a maximum of $(b_2 - b_1)$, $b_2 > b_1$ units in a batch according to FCFS rule without accessibility to the batches. The service time distributions are assumed to be exponential. Transient and steady state behaviour of the model is considered and we obtained expressions for the expected queue length and the expected waiting time in the queue.

Keywords: Controllable Bulk Service Queue, Accessible and Non-Accessible Batches, Transient Distribution, Steady State Distribution.