A Batch Arrival Queueing System with an Additional

Service Channel *

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Abstract

This paper deals with the steady state behaviour of an $M^X/G/1$ queue with an additional service channel, where the server may provide two phases of heterogenous service to the arriving customers. The service of the first phase is essential for all the customers. As soon as the essential service of a customer is completed, it may leave the system or may immediately go for second phase of service in an additional service channel in which case another unit at the head of queue is takenup for first essential service and this generalizes the result obtained by Madan (2000). In this paper we first derive the queue size distribution at random epoch as a generalization of Madan's result. Next we derive the queue size distribution at departure epoch as a classical generalization of Pollaczek-Khinchine formula for $M^X/G/1$ queueing system. Finally, we have obtained some important performance measures of this model.

Keywords: $M^X/(G_1, G_2)/1$ Queue, Queue Size, Waiting Time, Busy Period and Pollaczek-Khinchine Formula.