

On a Finite Capacity Bulk Service Queueing Problem

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Abstract

Consider a queueing situation with batch service at a departure epoch the size of the next batch to be served depends on both the size of the batch that is served out and also the number waiting at this epoch. The service times are independent random variables with general distribution depending on the size of the batch being served. Arrivals form a Poission process. The system has a waiting room of maximum capacity $*$ and $*$ service of capacity $***$. We derive the time dependent and limiting system size probabilities. The distributions of the busy period and virtual waiting time are obtained. Some numerical examples are provided and a control problem analyzed.

Keywords: Bulk Service, Markov Dependent Batch Size, Semi-Regenerative Process, Busy Period, Virtual Waiting Time.