

## Computation of Queue Length Probabilities for Bulk Service Queues with Vacation and Feed Back

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### Abstract

A  $M/G^{A,B}/1$  queue with infinite waiting space is considered. There is a single server who can serve at a time, a batch of minimum size ' $A$ ' and maximum size ' $B$ '. The server is free to take vacation and the customer has a feedback facility. For such a system the LST and pgf are formulated from which the queue length probabilities and some other performance measures are derived. A special case of this queue with distributions of service and vacation time as exponential is solved by both analytical approach (i.e. root-finding method) and by the method of characteristic equations. The numerical results obtained by both methods are found to agree well. It is also found that, the queue length has a direct trend (increase or decrease) with feedback probability as well as the arrival rate when all other parameters are kept same.

*Keywords:* Server Vacation, Batch Service, Feed Back, Markovian Queue, Root-Finding Method, Method of Characteristic Equation.