A General Input Queue with *N* Policy and Service Rate Depending on Bulk Size

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Abstract⎯An embedded Markov chain is used to analyze a G/M/1 queuing system with *N* policy. When the system is empty, the server remains idle (deactivates) and does not start serving the waiting customers in the queue until the number of arrivals reaches *N*. The service is performed in batches of min(*n*, *N*) if there are *n* customers waiting at the completion of service. Service times of the server depend on the batch sizes. We utilize the matrix-geometric method in the solution procedure and solve the stationary probabilities of the number of customers in the system by means of simultaneous linear equations. We further obtain a number of explicit and computationally tractable results such as mean queue length and mean waiting time in the queue. A numerical example illustrates the validation of the solution procedure.

Keywords⎯Bulk service, Bontrol policy, Queue, Waiting time distribution

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