

A Discrete-time Queueing System With Feedback and Optional Service

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Abstract

Queueing systems constitute a central tool in modeling and performance analysis. These types of systems are in our everyday life activities, and the theory of queueing systems was developed to provide models for forecasting behaviors of systems subject to random demand. The practical and useful applications of the discrete-time queues make the researchers to continue making an effort in analyzing this type of models. Thus the present contribution relates to a discrete-time Geo/G/1 queue in which some messages may need a second service time in addition to the first essential service. In day-to-day life, there are numerous examples of queueing situations in general, for example, in manufacturing processes, telecommunication, home automation, etc, but in this paper a particular application is the use of video surveillance with intrusion recognition where all the arriving messages require the main service and only some may require the subsidiary service provided by the server with different types of strategies.

We carry out a thorough study of the model, deriving analytical results for the stationary distribution. The generating functions of the number of messages in the queue and in the system are obtained. The generating functions of the busy period as well as the sojourn times of a message in the server, the queue and the system are also provided.

References

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