

Classical and Bayesian Estimations of Performance Measures in a Single Server Markovian Queueing System Based on Arrivals During Service Times *

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Abstract

The present study considers a single-server Markovian queueing system by observing the number of customer arrivals during the service time of a customer. We estimate the traffic intensity in this queueing system along with the average queue length and the expected number of customers in the system. We propose classical and Bayesian frameworks to estimate the parameters of interest. In the Bayesian setup, three forms of prior distributions for ρ and two loss functions are considered. Furthermore, the predictive distribution of the number of customer arrivals during the service time of a customer and the equal-tailed credible region of ρ are obtained. The aforementioned approaches are illustrated with numerical examples based on simulation studies.

Keywords: Queueing; $M/M/1$ queue, maximum likelihood estimation, Bayesian estimation, predictive distribution, credible interval.

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