

Change Point Estimation of Service Rate in $M/M/1/m$ Queues: A Bayesian Approach *

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Abstract

This article presents a novel approach for detecting a change point in the service rate of an $M/M/1/m$ queue. The change point is identified by detecting a change in the probability distribution of a stochastic process. To achieve this, the article proposes a likelihood function that is constructed based on the observed number of customers left in the system at departures. Bayesian estimators are then derived using this likelihood function. The effectiveness of the proposed methods is evaluated through extensive Monte Carlo simulations. Overall, the results demonstrate the effectiveness of the proposed approach for detecting change points in service rates.

Keywords: Change point detection; Bayesian estimators; Gauss hypergeometric; loss functions.

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