

# A Note on Bayesian Estimation of Traffic Intensity in Single-server Markovian Queues \*

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## Abstract

In queuing theory, a major interest of researchers is studying the behaviour and formation process and analysing the performance characteristics of queues, particularly the traffic intensity, which is defined as the ratio between the arrival rate and the service rate. However, these parameters are usually unknown and must be estimated using some statistical inferential method. This article aims to obtain better Bayesian estimates for the traffic intensity of  $M/M/1$  queues, which, in Kendall notation, stand for Markovian single-server infinity queues. The Jeffreys prior is proposed to obtain the posterior and predictive distributions of some parameters of interest. Samples are obtained through simulation and some performance characteristics are analysed. It is observed from the Bayes factor that Jeffreys prior is competitive, among informative and non-informative prior distributions, and presents the best performance in many of the cases tested.

**Keywords:** Markovian queues, Bayesian inference, Jeffreys prior, posterior distribution.

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\*Communications in Statistics - Simulation and Computation. Oct. 2018, Volume 47, Issue 9, p. 2577-2586. Copyright © 2018, Almeida & Cruz. All rights reserved. DOI: [10.1080/03610918.2017.1353614](https://doi.org/10.1080/03610918.2017.1353614). The final publication is available at <https://www.tandfonline.com>.