Simple and Yet Efficient Estimators for Markovian Multi-server Queues *

Emilio Suyama, Roberto C. Quinino, Frederico R. B. Cruz

Departamento de Estatística
Universidade Federal de Minas Gerais
31270-901 - Belo Horizonte - MG, Brazil

emilio@est.ufmg.br, roberto@est.ufmg.br, fcruz@est.ufmg.br

Abstract

Estimators for the parameters of the Markovian multi-server queues are presented, from samples that are the number of clients in the system at arbitrary points and their sojourn times. As estimation in queues is a recognizably difficult inferential problem, this study focuses on the estimators for the arrival rate, the service rate, and the ratio of these two rates, which is known as the traffic intensity. Simulations are performed to verify the quality of the estimations for sample sizes up to 400. This research also relates notable new insights, for example, that the maximum likelihood estimator for the traffic intensity is equivalent to its moment estimator. Some limitations of the results are presented along with a detailed numerical example and topics for future developments in this research area.

Keywords: Markovian queues, classical inference, maximum likelihood estimator, traffic intensity, arrival rates, service rate.

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