

A New Approach Solving a Two-Node Closed Queueing Network

Hsing Luh

National Chengchi University

R.O.C.

Yi-Wen Chuan

National Chengchi University

R.O.C.

Abstract

In this paper, a general approach to solve a closed queueing network of two nodes in which the service times are of the phase type is considered. The Laplace-Stieltjes Transforms of service time distributions satisfying a system of equations is presented first. According to state balance equations, the stationary probabilities on the unboundary states can be shown as a linear combination of Kronecker product-forms. Each component of these products can be expressed in terms of roots of an associated characteristic polynomial. Furthermore, a procedure for solving stationary probabilities can be presented. The complexity of this approach that is independent of the number of customers in the system is proved. Consequently, the computational complexity for a general closed queueing network can be reduced.

Keywords: Closed Queueing Networks, Matrix-Geometric Solutions, Kronecker Product-Forms.