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A Markovian queue with two heterogeneous servers and multiple vacations

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In this paper, we study an M/M/2 queueing system with multiple vacations where the service rates of the servers are not identical. This queuing system has been analyzed as a quasi-birth and death process by Kumar and Madheswari (2005). However, by expressing the rate matrix explicitly, we have obtained a explicit expression of the stationary distribution of the queue length. The conditional stochastic decomposition properties of the queue length and the waiting time have been also established for such a system.

Keywords: Queueing system, matrix-geometric solution, multiple vacations, stochastic decomposition., heterogeneous servers.

Mathematics Subject Classification: Primary: 60K25; Secondary: 90B2.

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A queueing system with two heterogeneous servers and multiple vacations was studied by Kumar and Madheswari (2005) , who obtained the stationary queue length distribution by using a matrix geometric method and provided an analysis of busy period and waiting time. In Kumar, Madheswari, and Venkatakrishnan (2007) , the same authors introduced the M / M /2 queueing system with heterogeneous servers subject to catastrophes, and provided a transient solution for the system under study. ...Â We consider a Markovian queueing system with two unreliable heterogeneous servers and one common queue. The servers serve customers without preemption and fail only if they are busy. Queueing systems with unavailable servers can be a useful abstraction in modelling of some real-life service operation. Such models may arise naturally as models of many computer, communication and manufacturing systems. Servers interruptions may result from resource sharing, server breakdowns, priority assignment, vacations, some external events, and others.Â We consider a system with m heterogeneous servers and a common queue. Service times of customers by the Â¿th server constitute a sequence {^Â¡,â€ž}â„¢=1 of independent identically distributed (iid) random variables that does not depend on input flow and service times by other servers. Let Bi(t) be a distribution function (d.f.) of and fy = < ro (i = 1 ,m). We assume that the.