The effect of server's breakdown on the performance of finite-source retrial queueing systems

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Abstract

In this paper single server homogeneous finite-source retrial queueing systems are investigated. The server is assumed to be subject to random breakdowns depending on whether it is busy or idle. The failure of the server may block or unblock the systems's operations and the service of the interrupted request may be resumed or the call can be transmitted to the orbit. All random variables involved in the model constructions are supposed to be exponentially distributed and independent of each other.

The novelty of investigations is the different type of non-reliabilility of the server. The MOSEL (Modeling, Specification and Evaluation Language) tool, developed at the University of Erlangen, Germany, was used to formulate and solve the problem and the main performance and reliability measures were derived and graphically displayed. Several numerical calculations were performed to show the effect of the non-reliability of the server on the mean response times of the calls, the overall utilization of the system, and the mean number of calls staying at the server or in the orbit.

Keywords: homogeneous population, retrial queueing systems, finite number of sources, non-reliable server, performance tool, performance and reliability measures

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