

DELAY ANALYSIS OF A QUEUEING SYSTEM WITH RESEQUENCING BUFFER

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There are simple service disciplines where the system time of a tagged customer depends only on the customers arrived to the system earlier (e.g. FIFO) or later (e.g. LIFO) than the tagged one. In this paper we consider the analysis of a queueing system with a resequencing buffer in which the system time of a tagged customer depends on both the customers arrived to the system earlier and later than the tagged one.

Customers arrive to the system as regular customers which are served in FIFO order, but a resequencing signal can transform a regular customer into a delayed one, who is served sequentially with lower priority than the regular ones. A customer resequencing is initiated by external resequencing signals. The analysis of the system is composed by the double transform domain description of the stationary distribution of the regular and delayed customers at arrival and the delay analysis which is based on multiplicative dependence of the delay on the number of customers in the system.

A similar queueing system has been analyzed with memoryless ingredients (arrival, service, resequencing) in a previous work. In this paper we investigate if the essential analytical properties which made the analysis of the memoryless system feasible remain valid in case of Markov modulated environment, which is closely related with the commutativity of some characterizing matrices.