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$M/M/1/1$ QUEUEING-INVENTORY SYSTEM WITH RETRIAL OF UNSATISFIED CUSTOMERS

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ABSTRACT: This paper considers an $M/M/1/1$ queueing-inventory system with retrial of unsatisfied customers. Arrivals taking place when server is busy, proceed to an orbit of infinite capacity. From the orbit, the head of the queue alone retires to access the server. Failed attempts to access an idle server with positive inventory results in the retrial customer returning to orbit. The inter-retrial times are independent identically distributed exponential random variables with parameter θ, irrespective of the number of customers in the orbit. Primary customers, who encounter an idle server without stock at its arrival epoch, leave the system for ever. We compute the condition for stability and then employ algorithmic approach for the computation of the system steady-state probability. We derive the expected waiting time of a customer in the orbit; distribution of the time until the first customer goes to orbit and also the probability of no customer going to orbit in a given interval of time. An optimization problem is investigated numerically.

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