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A perishable inventory model with two types of customers, Erlang-k service, linear repeated attempts and a finite populations

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Abstract. The present paper deals with a generalization of the homogeneous single server finite source retrial queuing-inventory system with Erlang-k service in which the items may be serviced before it is delivered to the customers. We assume that not all customers would be requiring service on items. Hence we propose to have two types of customers, say, high priority and low priority. The high priority customer demands a unit item with require service on the demanded item before accepting it and the low priority customer demands a unit item but do not require any service on his demanded item (i.e., service time is zero). The service time of high priority customer follows an Erlang k-type distribution with service rate $k\mu$ for each phase. Retrial is introduced for low priority customers only. The life time of the item is assumed to have exponential distributions. The inventory is replenished according to an (s, S) policy and the replenishing times are assumed to be exponentially distributed. The joint probability distribution of the number of high priority customers in the waiting area, the number of low priority customers in the orbit and the inventory level is obtained for the steady state case. Some important system performance measures in the steady state are derived.

Keywords: (s, S) policy, Continuous review, Inventory with service time, Markov process, Linear repeated attempts, Priority customers, Finite population
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