



## Retrial inventory system with multiple working vacations and two types of customers

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**Abstract.** In this article, we consider a continuous review perishable inventory system with retrial demands. The maximum storage capacity is  $S$ . We assume that the replenishment of inventory is instantaneous. The life time of each item is assumed to be exponential. 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 customers arrive based on two homogeneous independent Poisson processes. Retrial is introduced for high priority customers only. The arriving high priority customer who finds the server is busy joins an orbit of unsatisfied customers. The orbiting customers compete for service by sending out signals that are exponentially distributed. The single server takes a working vacation at times when customers being served depart from the system and no customers are in the orbit. The duration of server working vacation follows an exponential distribution. At the end of each working vacation, the server only takes another new vacation if there is no any new high priority customer or repeated customer from the orbit. The joint probability distribution of the number of customer in the orbit and the inventory level is obtained for the steady state case. Some important system performance measures and the long-run total expected cost rate are derived in the steady state. Several numerical examples are presented to illustrate the effect of the system parameters and costs on these measures.

**Keywords:** Continuous review inventory system, Perishable item, Service facility, Multiple working vacation, Retrial, Two types of customers

**MSC numbers:** 60J27, 90B05

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