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## M / M / 1 type service-stock system with vacations, vacation interruptions and lost sales

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A single-server service-stock system is considered under the conditions of a replenishment strategy (s, Q) with vacations, vacation interruptions, and lost sales. During holidays, the server provides service at a slower rate than normal service. If in vacation mode some request is served by the server, then the server continues and ends its service in the same mode. After that, it switches to normal service mode, provided that at least one customer is in the queue. If there are no requests in the queue at the moment, the server switches to the vacation mode. We will also assume that if there are requests in the system at the time of service completion during the holidays, the server returns to its normal operating mode, otherwise it remains in the vacation mode. For a system with infinite capacity, the stationarity condition of the system is obtained, and the value of the stationary distribution vector is calculated. Estimates of various performance criteria are given. In addition, the analysis of the load period is carried out and the stationary distribution of the waiting time in the queue is obtained. Numerical illustrations of system performance are given, and an optimization problem is proposed.

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