BASE STOCK STOCHASTIC INVENTORY SYSTEM IN JACKSON NETWORK

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SUMMARY

In this paper, we consider base stock stochastic perishable inventory system in open Jackson network at a service facility. In this network we proposed single server at each node with attached inventory where each node represents a queue in which different nodes have different service rates. Service times are exponentially distributed. Customers arrive in the system according to a Poisson process. There is no priority in serving the customers. All customers at each node are served on a first-come, first-served basis. For this system arriving customers form two waiting line based on the order of their arrivals. The maximum storage capacity for ith warehouse is fixed as S_i. When the on hand inventory level drops to a prefixed level $s_i = 0$, an order for $Q_i = 1; (i = 1, 2)$ units is placed. In this model the replenishment of inventory is instantaneous i.e. demand is refilled one unit at a time. The items of inventory have exponential life times. Matrix Analytical method (MAM) is applied for this system. The proposed method is quite efficient and practically well suited for approximate performance estimates. The joint probability distribution of the number of customers in the system and the inventory level is obtained in the steady state case. Some important system performance measures in the steady state are derived. A suitable cost function is defined and analyzed. The total expected cost rate is also calculated. Sensitivity analysis has been carried out to study the effect of variation of parameters. Some numerical and graphical illustrations are provided.

Keywords and phrases: Jackson network, Base stock, perishable item, Matrix Analytical method.

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