

Abstract

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Inventory Control for a Joint Replenishment Problem with Stochastic Demand

—Most papers model Joint Replenishment Problem (JRP) as a (r, Q) where r is a multiple value for a common review period T , and Q is a predefined order up to level. In general the (r, Q) policy is characterized by a long out of control period which requires a large amount of safety stock compared to the (s, T) policy. In this paper a probabilistic model is built where an item, call it item i , with the shortest order time between interval T_i is modeled under (r, Q) policy and its inventory is continuously reviewed, while the rest of items (j) are periodically reviewed at a definite time corresponding to item i . An order up to level policy for items (j) is applied in synchronization with item i . For the sake of inventory out of control period reduction for items i , an inventory review is done on the inventory position for items i one period before replenishment, at $T_i - 1$ period. A lower control value s_i is determined using an iterative method, if the inventory position is above this value then an order is done at the T_i period, otherwise it is made at $T_i - 1$ period. Another iterative method is used to find the optimum order up to level Q_i for this policy.