Analysis of Inventory Systems with a Cutoff Point and Joint Replenishments

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Abstract

This paper is concerned with the control of iventory items which experience lumpy demands. A discrete stuttering Poisson distribution is used to approximate the nature of demands and a continuous review (s,S) inventory policy is used to control such items. In order not to disrupt the inventory system, a cutoff point is included in the control policy such that customer orders with transaction sizes less thanor equal to the cutoff point will be met from stock. Customer orders with transaction sizes greater than the cutoff point will be filtered out of the inventory system and satisfied by placing a special replenishment order to higher echelon. In order to reduce the annual replenishment cost, it is also specified that if the available inventory is below the order-up-to level S at the time when a special replenishment order is placed, such a replenishment order will also raise the available inventory level to S. A search procedure is presented for determining the optimal values of the control parameters s and S. the theoretical results obtained are illustrated with a numerical example.

Keywords: Inventory Control, Stuttering Poisson Distribution, Lumpy Demands, Cutoff Point.