

Genetic algorithm to solve the lot-sizing problem with multi-supplier and quantity discount

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### Abstract

Inventory management has been a popular topic in both the academic field and in real practice for decades. As the production environment getting increasingly complex, various kinds of mathematical models have been developed, such as linear programming, nonlinear programming, mixed integer programming, geometric programming, gradient-based nonlinear programming and dynamic programming, to name a few. In this paper, an efficient genetic algorithm (GA) is proposed to solve the lot-sizing problem with multi-supplier and quantity discount. The objectives are to minimize total costs, where the costs include ordering cost, holding cost, purchase cost and transportation cost, under the requirement that no inventory shortage is allowed in the system, and to determine an appropriate inventory level for each planning period. The results demonstrate that the proposed GA model is an effective and accurate tool for determining the replenishment for a manufacturer for multi-periods.

Keyword : Genetic algorithm; Lot-sizing; multi-supplier; Quantity discount; Replenishment.