

Multi-objective programming for lot-sizing with quantity discount

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Abstract

Multi-objective programming (MOP) is one of the popular methods for decision making in a complex environment. In a MOP, decision makers try to optimize two or more objectives simultaneously under various constraints. A complete optimal solution seldom exists, and a Pareto-optimal solution is usually used. Some methods, such as the weighting method which assigns priorities to the objectives and sets aspiration levels for the objectives, are used to derive a compromise solution. The ϵ -constraint method is a modified weight method. One of the objective functions is optimized while the other objective functions are treated as constraints and are incorporated in the constraint part of the model. This research considers a stochastic lot-sizing problem with multi-suppliers and quantity discounts. The model is transformed into a mixed integer programming (MIP) model next based on the ϵ -constraint method. An illustrative example is used to illustrate the practicality of the proposed model. The results demonstrate that the model is an effective and accurate tool for determining the replenishment of a manufacturer from multiple suppliers for multi-periods.

Keyword : Stochastic lot-sizing; mixed integer programming; multi-objective programming.