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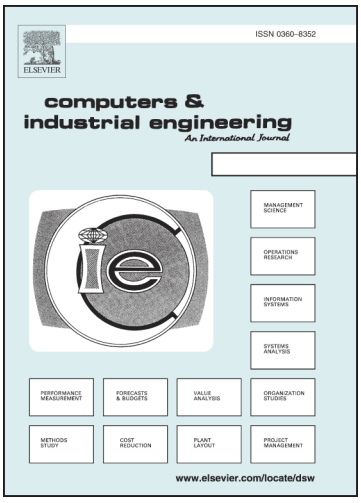

Lot sizing and supplier selection with multiple items, multiple periods, quantity discounts, and backordering

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Lot sizing and supplier selection with multiple items, multiple periods, quantity discounts, and backordering

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Abstract

A general model is presented for a realistic multi-item lot-sizing problem with multiple suppliers, multiple time periods, quantity discounts, and backordering of shortages. Mixed integer programming (MIP) is used to formulate the problem and obtain the optimum solution for smaller problems. Due to the large number of variables and constraints, the model is too hard to solve optimally for practical problems. In order to tackle larger problem sizes, two heuristic solution methods are proposed. The first method is developed by modifying the Silver-Meal heuristic, and the second one by developing a problem-specific Genetic Algorithm (GA). Both heuristic methods are shown to be effective in solving the lot-sizing problem, but the GA is generally superior.

Keywords

lot sizing; supplier selection; quantity discounts; production and inventory control; mixed-integer programming; genetic algorithms