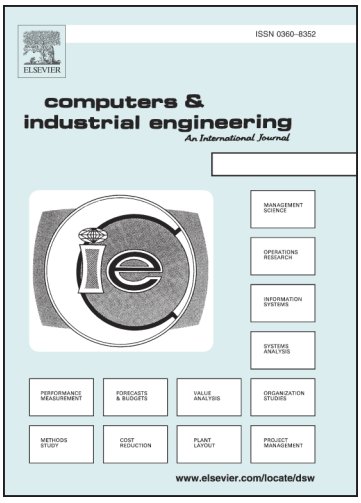

A bi-objective two-level newsvendor problem with discount policies and budget constraint

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Abstract

In this study, a single-period two-level inventory control problem is modeled in which the demand is a random variable and shortage is assumed as lost sales. The aim is to maximize the expected profit and the service level at the end of the season, simultaneously. The setting investigated in this research is unique in the sense that both all-units and incremental discount policies are considered under a budget constraint. The developed NP-hard bi-objective optimization problem cannot be solved using an exact method within a reasonable computational time. Thus, a meta-heuristic algorithm, namely multi-objective invasive weeds optimization algorithm (MOIWO) is developed to solve the proposed problem. As there is no benchmark available in the literature, two other meta-heuristics including a non-dominated sorting genetic algorithm II (NSGA-II) and a non-dominated ranking genetic algorithm (NRGA) are used to validate the solution obtained by MOIWO. In addition, we used the Taguchi method to find the tuned values of the algorithm parameters. Finally, 30 randomly generated test problems are considered in order to assess the performance of the solution methods as well as to demonstrate the appropriateness of the developed methodology.

Keywords: Two-Level; Single period; Discount policy; Multi-objective optimization; Meta-heuristic algorithms

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