

Modeling and solving a multi-objective supplier quota allocation problem considering transaction costs.

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Abstract

Suppliers' evaluation is a subject, which has attracted the attention of many researchers. The performance of potential suppliers is evaluated against multiple criteria rather than considering a single factor such as cost or quality. One of the major objectives of suppliers' evaluation is to determine the optimal quota assigned to each supplier while needing to replenish an order. This problem has been studied by many researchers as a multi-objective problem. The usual objectives are minimizing the purchasing cost, rejected units, and late delivered units. However, in a few researches maximizing the evaluation scores of the selected suppliers is considered as fourth objective. In this paper, we present a model with five objectives including minimizing the transaction costs of purchasing from suppliers as well as the four addressed objectives. We convert the model to a single objective one using the well-known weighting method, solve it utilizing two meta-heuristic algorithms, and analyze the efficiency of the heuristics. The reason why we utilize the meta-heuristic algorithms is that the problem is proved to be an NP-hard one.

Keywords: Supplier selection, Quota allocation, Transaction costs, Multi-objective, Meta-heuristic algorithms.