عنوان مقاله:

A Hybrid Heuristic Algorithm to Solve Capacitated Location-routing Problem With Fuzzy Demands

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خلاصه مقاله:

In this paper, the capacitated location-routing problem with fuzzy demands (CLRP-FD) is considered. The CLRP-FD is composed of two well-known problems: facility location problem and vehicle routing problem. The problem has many real-life applications of which some have been addressed in the literature such as management of hazardous wastes and food and drink distribution. In CLRP-FD, a set of customers with fuzzy demands should be supplied by a fleet of vehicles that start and end their tours at a single depot. Moreover, the vehicles and the depots have a limited capacity. To model this problem, a fuzzy chance-constrained programming is designed based on fuzzy credibility theory. To solve the CLRP-FD, a hybrid heuristic algorithm (HHA) including two main phases is proposed. In the first phase, an initial population of solutions is generated by the greedy clustering method (GCM) obtained from the literature of the problem, while in the second phase, a genetic algorithm is applied for further improvement of the solutions of first phase. While the first phase of the HHA consists of four steps, the second phase includes two main steps. To achieve the best value of the major parameter of the model, named dispatcher preference index, and to analyze its influence on the changes of the final solution, numerical experiments with different sizes on the number of customers and candidate depots are carried out. The computational results show that the HHA is efficient so that it has improved all solutions that obtained from the GCM. Finally, performance of the proposed model to the similar model exists in the literature is evaluated by several standard test problems of the CLRP.

کلمات کلیدی:

Capacitated location-routing problem, Fuzzy demand, credibility theory, Stochastic simulation, Fuzzy-chance constrained programming, Genetic algorithm.