

عنوان مقاله:

A Capacitated Fuzzy p-Hub Center Transportation Network: A Memories-Based Genetic Algorithm

محل انتشار:

اولین کنفرانس ملی آینده مهندسی و تکنولوژی (سال: 1395)

تعداد صفحات اصل مقاله: 26

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خلاصه مقاله:

In real applications of hub networks, the travel times may vary due to traffic, climate conditions, and land or road type. To facilitate this difficulty, in this paper the travel times are assumed to be characterized by trapezoidal fuzzy variables to present a fuzzy capacitated single allocation p-hub center transportation (FCSApHCP) with uncertain information. The proposed FCSApHCP is redefined into its equivalent parametric integer nonlinear programming problem using credibility constraints. The aim is to determine the location of p capacitated hubs and the allocation of center nodes to them in order to minimize the maximum travel time in a hub-and-center network under uncertain environments. As the FCSApHCP is NP-hard, a novel approach called memories-based genetic algorithm (MGA) is developed to solve it. This algorithm utilizes two knowledge modules to gain a good and bad knowledge about hub locations and saves them in a good and bad hub memory, respectively. As there is no benchmark available to validate the results obtained, a genetic algorithm with multi-parent crossover is designed to solve the problem as well. Then, the algorithms are tuned to solve the problem, based on which their performances are analyzed and compared statistically. Finally, the applicability of the proposed approach and the solution methodologies are demonstrated. Sensitivity analyses on the discount factor in the network and the memory sizes of the proposed MGA are conducted at the end to provide more insights.

کلمات کلیدی:

Capacitated p-hub center transportation; Single allocation; Fuzzy travel time; Memories-based algorithm; Genetic algorithm; Uncertain information

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