عنوان مقاله:

Optimizing a Fuzzy Greenp-hub Center Problem using Opposition Biogeography Based Optimization Algorithm

محل انتشار:

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خلاصه مقاله:

Hub networks have always been acritical issue in locating health facilities. Recently, a study has been investigated by Cocking et al. (2006)in Nouna health district in Burkina Faso, Africa, with a population of approximately 275,000 people living in 290 villages served by 23health facilities. The travel times of the population to health services become extremely high during the rainy season, since many roads areunusable. In this regard, for many people, travelling to a health facility is a deterrent to seeking proper medical care. Furthermore, in realapplications of hub networks, the travel times may vary due to traffic, climate conditions, and land or road type. To handle this challengethis paper considers the travel times are assumed to be characterized by trapezoidal fuzzy variables in order to present a fuzzy greencapacitated single allocation p-hub center system (FGCSApHCP) with uncertain information. The proposed FGCSApHCP is redefined intoits equivalent parametric integer nonlinear programming problem using credibility constraints. The aim is to determine the location of pcapacitated hubs and the allocation of center nodes to them in order to minimize the maximum travel time in a hub-and-center network insuch uncertain environment. As the FGCSApHCP is NP-hard, a novel algorithm called opposition biogeography based optimization isdeveloped to solve that. This algorithm utilizes a binary opposition based learning mechanism to generate a diversity mechanism. At theend, both the applicability of the proposed approach and the solution methodologies are demonstrated using GAMS/BARON Softwareunder several kind of problems. Sensitivity analyses on the number of hubs and center .nodes are conducted to provide more insights aswell

کلمات کلیدی:

Capacitated p-hub center system, Single allocation, Fuzzy travel time, Opposition based learning, Biogeography based optimization, Uncertain information