

Presentation of new Heuristic Solution Method For Location-Allocation Problem

Abstract:

The location_allocation problem is one of the facility location problems in which it should be determined the location place of some servicemen to provide some customer demands and the way of allocating of customers to the servicemen. These kinds of problems are among the NP-Hard problems which their complicating problems increases exponentially by increasing department numbers. For this reason, the traditional methods can't be used to solve these problems. Also heuristic and meta heuristic methods are used on problem solving.

In this research the capacitated P-median problem which is a kind of discrete location-allocation problems is considered. At first a new formulation is introduced for the considered problem, then according to Hopfield neural network model, the energy function network is defined by penalty function method and finally a comprehensive structure is proposed for the network in order to prevent from tuning penalty parameters. At the end 32 test problems is examined for finding neural network algorithm validity and the gained results are compared with the results of GAMS software and genetic algorithm. The results show that algorithm based on neural network provides acceptable solution with extremely low time compared with the genetic algorithm. By an increase in the input, the efficiency of software decrease to obtain feasible solution. While the proposed neural network algorithm is able to achieve feasible solution in acceptable time. After testing the proposed algorithm validity, the location-allocation light and heavy maintenance depots of passenger cars at country rail transportation network is solved.

Keywords: Location-Allocation Problem, Hopfield Neural Network, Genetic Algorithm, Maintenance Depots of Passenger Cars