

Service centers location problem considering service diversity within queuing framework

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Abstract

In this paper, a new model is developed considering diversity of service in service centers location problem. It is assumed that different services can be provided at each service center. The model has three objective functions including: minimizing the sum of customers travel time and waiting time in service centers, balancing service loads among the given centers, and minimizing the total establishment costs of service centers and assignment costs of servers. Different number of servers can be assigned to each service center. Regarding the allocation of customers to the service centers, each customer patronizes with respect to the distance to the center, the attractiveness of each service center's site for the customer and the number of located servers at the service center. Since the proposed model is of nonlinear integer programming type and is of high complexity in solving, two meta-heuristic based heuristics using Particle Swarm Optimization (PSO) and Variable Neighborhood Search (VNS) are proposed in order to solve the problem. Different sizes of numerical examples are designed and solved in order to compare the efficiency of the heuristics.

Keywords: Location, Queuing systems, Service diversity, Particle swarm optimization, Variable neighborhood search