A heuristic design method for vehicle routing problems with time windows

J. Li¹, Z. Liu*¹

¹Hebei University of Technology, China

Abstract

The vehicle routing problems (VRP) can be described as designing appropriate routing from one depot to a set of geographically scattered demand (customer) points. The design of VRP has the following features: each customer is visited by one vehicle, the total demands of one route cannot exceed the vehicle capacity and all routes start and end at the depot. In this paper, the vehicle routing problems with time windows (VRPTW) is investigated. The goal is to minimize the total travelling distance on the basis of each customer is visited in given time interval. This paper presented a heuristic design method for solving vehicle routing problems with time windows by using the distance potential concept, which was proposed recently. The distance potential is the sum of the distances from the demand (customer) being considered to other demands and the depot. The demand, which should be considered in the first routing, is determined by the values of the distance potentials and the time constraints. Then, the network can be designed starting from the first point identified. In the design procedure, a few heuristic rules proposed in this paper are used. The results of the illustrated examples show that the designs obtained in this work are comparable to that obtained in the literature. It is demonstrated that the method proposed is simple and of high computational efficiency.