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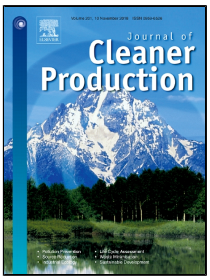

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An improved artificial bee colony for facility location allocation problem of end-of-life vehicles recovery network

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Abstract

Reverse logistics is indispensable for resources reuse and circular economy, and a reverse logistics network optimization problem for end-of-life vehicles is studied frequently. Recent researches have focused on the material flow for different end-of-life vehicles. However, the primary question for an end-of-life vehicles recovery network is to determine optimal network nodes. To account for it, we considered a facility location allocation problem of end-of-life vehicles recovery network, and established a mathematical model to solve it. The model is used to achieve the minimization of cost for deciding optimal locations of end-of-life vehicles recovery network. The facility location allocation problem is a non-deterministic polynomial complete problem proved with increase in the number of candidate locations. This type of problem usually handled by a metaheuristics. Therefore, we proposed a valid novel approach based on artificial bee colony to solve the problem. Artificial bee colony is an optimization method that imitates bee behavior. Also, the proposed algorithm is applied to two different scale real-life cases, and some comparisons with several presented algorithms are presented to illustrate the effectiveness of the presented method.

Keywords: reverse logistics; facility location allocation; end-of-life vehicles; metaheuristics; artificial bee colony

Introduction

Rapid development in automobile industry make China becoming largest automobile consumption market in the world. According to statistics from the traffic management department of the Ministry of public security, at the end of June 2017 in China, the vehicle population have reached 304 million. With the development of intelligent vehicle, vehicles are no longer simple traffic tools. Many new technologies have been applied to the automotive field, which has enabled