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A memetic algorithm for the inventory routing problem

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Abstract

In this article, we study an Inventory Routing Problem with deterministic customer demand in a two-tier supply chain. The supply chain network consists of a supplier using a single vehicle with a given capacity to deliver a single product type to multiple customers. We are interested in population-based algorithms to solve our problem. A Memetic Algorithm (MA) is developed based on the Genetic Algorithm (GA) and Variable Neighborhood Search methods. The proposed meta-heuristics are tested on small and large reference benchmarks. The results of the MA are compared to those of the classical GA and to the optimal solutions in the literature. The comparison shows the efficiency of using MA and its ability to generate high quality solutions in a reasonable computation time.

Keywords Inventory routing problem · Genetic algorithm · Memetic algorithm · Variable neighborhood search · Order crossover · Optimization

1 Introduction

Transport activities are an important part of logistics, which is constantly evolving in response to the globalisation of trade, computerisation of processes, new consumption patterns and environmental requirements. Logistics managers coordinate the entire

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