Comparison between Two Algorithms for Multi-Depot Vehicle Routing Problem with Inventory Transfer between Depots in a Three-Echelon Supply Chain

International Journal of Computer Applications
© 2011 by IJCA Journal

Number 6 - Article 8

Year of Publication: 2011

Authors:
Farzaneh Amiri Fard
Mostafa Setak

10.5120/3388-4703
{bibtex}pxc3874703.bib{/bibtex}

Abstract

Coordination in supply chain plays an important role on the successful performance of all parts of supply chain. This paper studies an integrated distribution system in a three-echelon supply chain including a single plant, multiple distribution centers and a set of retailers with deterministic demands. Possibility of transferring goods between depots is taken into account.
To solve the problem, first we formulate a mixed integer programming model to the overall system. Since solving mixed integer programming problems with optimization solvers is memory intensive and insufficient physical memory is one of the most common problems when running large size of these problems, we propose two approaches to solve the model and compare them. First approach is a constructive two-phase heuristic: The purpose of the first phase is to assign retailers to distribution centers and determine the source of inventory replenishment for each depot. After assigning retailers to the depots, sequence of routes for each depot is determined with a Simulated Annealing algorithm. Second approach is a Tabu search algorithm with different neighborhood structures that solve the model integrally, not in two phases. Computational results indicate the effectiveness of two proposed algorithms but when the integrated algorithm is used, better results achieved.

Reference

Comparison between Two Algorithms for Multi-Depot Vehicle Routing Problem with Inventory Transfer between Depots in a Three-Echelon Supply Chain

Index Terms

Computer Science
Operational Research

Key words

Multi-depot vehicle routing problem
mixed integer programming
heuristic algorithm
Simulated Annealing
Tabu search

inventory transfer