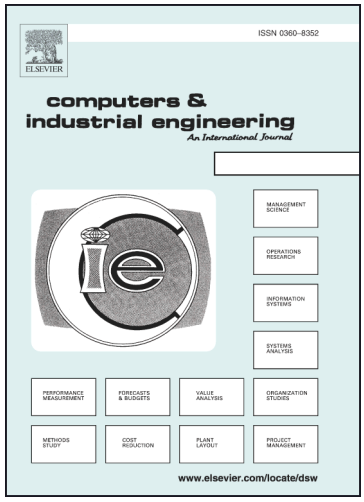
Accepted Manuscript



A three level joint location-inventory problem with correlated demand, shortages and periodic review system: Robust meta-heuristics

Behnam Vahdani, M. Soltani, M. Yazdani, S.M. Mousavi

PII: S0360-8352(17)30188-2
DOI: http://dx.doi.org/10.1016/j.cie.2017.04.041
Reference: CAIE 4728

To appear in: *Computers & Industrial Engineering*

Received Date: 20 November 2015
Revised Date: 25 February 2017
Accepted Date: 26 April 2017

Please cite this article as: Vahdani, B., Soltani, M., Yazdani, M., Mousavi, S.M., A three level joint location-inventory problem with correlated demand, shortages and periodic review system: Robust meta-heuristics, *Computers & Industrial Engineering* (2017), doi: http://dx.doi.org/10.1016/j.cie.2017.04.041

A three level joint location-inventory problem with correlated demand, shortages and periodic review system: Robust meta-heuristics

Behnam Vahdani [1,a], M. Soltani [a], M. Yazdani[a] , S.M. Mousavi[b]

[a] *Faculty of Industrial and Mechanical Engineering, Qazvin Branch, Islamic Azad University, Qazvin, Iran*

[b] *Department of Industrial Engineering, Faculty of Engineering, Shahed University, Tehran, Iran*

A three level joint location-inventory problem with correlated demand, shortages and periodic review system: Robust meta-heuristics

Abstract

This paper considers a location-inventory problem in the three-level supply chain where demand across the retailers is assumed to be correlated and inventory shortages are allowed. For better monitoring the stock status, a periodic review of inventory level is taken into account. In order to overcome the joint location-inventory problem, this paper proposes an optimization model based on a mixed integer non-linear programming (MINLP) whose objective function is the minimization of the total supply chain costs. To solve the designed MINLP model, two meta-heuristic algorithms are presented, including genetic algorithm (GA) and simulated annealing (SA) with an appropriate decoding scheme. Since the performance of meta-heuristic algorithms depends on setting the parameters; therefore, the Taguchi method is used to set parameters of the developed solving algorithms. Finally, the proposed algorithms have been used to several numerical test problems that indicate the higher performance of the GA compared with the SA in terms of objective function.

***Keywords*:** Supply chain; Location; Periodic-review inventory; Correlated demand; Meta-heuristic algorithms; Taguchi method

1. Introduction

Now a day, one of the important issues in supply chain management is location-inventory decisions. Supply chain networks for many industries are regarded as the operating basis (Friesz el al., 2011; Nekooghadirli et al., 2014). A well-designed network strategy can potentially reduce supply chain costs by 60 percent (Harrison, 2004; Vahdani et al., 2011). In the conventional approach, the design of such a system is primarily related to the strategic issues by considering the number and location of facilities, including warehouses and plants, for a network with the minimum cost and without addressing the operational problems such as inventory control and service levels.

Typically, operational decisions in such a framework are usually adopted after the location is set. Numerous scholars have stated that this approach does not result in the most effective and efficient

[1]*Corresponding author*
Email: b.vahdani@gmail.com