

A tabu search-based heuristic for a new capacitated cyclic inventory routing problem

[Mehdi Seifbarghy](#) and Zahra Samadi

Department of Industrial Engineering, Alzahra University, Tehran, Iran

Abstract

In this paper, a special case of inventory routing problem, in which a distribution centre as the supplier distributes a single product to a set of sales-points using economic order quantity policy to manage inventories, is investigated. A fleet of homogeneous vehicles, each with a given capacity, is available for delivery of inventory to the sales-points served by a vehicle in a cyclical manner in such a way that at no moment a stock-out occurs. Demand rates at the sales-points are constant and known to the supplier. The proposed model in this paper extends the concept of vehicle multi-tours considering the inventory costs of the supplier; in other words, the objective is to minimise total ordering and inventory holding costs of the supplier coordinately with fleet operating, sales-points inventory holding and distribution costs during a given planning horizon. The frequency and routes by which each sales-point is to be served and the type of vehicles for this purpose are determined by this model. We have developed a tabu search-based heuristic to solve the problem. Because of the novelty of the model, a set of numerical examples is designed and solved in order to assess the performance of the model.

Keywords: Vehicle multi-tours, Inventory-routing, Economic order quantity, Tabu search, Operational research.