An inventory model with METRIC approach in location-routing-inventory problem

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ABSTRACT

In this paper, the stochastic location-routing-inventory problem is considered in which retailers’ demands and lead-times are stochastic. Demand quantities follow Poisson distribution and lead-times are functions of the shortage quantity. It is also assumed that both retailers and distributors hold inventory and follow (S-1, S) inventory policy. According to these assumptions, we use METRIC (i.e., Multi-Echelon Technique for Recoverable Item Control) approach to model the problem. For this purpose, a mixed integer stochastic programming model is developed based on extending the basic location-inventory-routing model by adding METRIC stochastic relations into the model. Since solving the model with the exact method is very difficult, the Meta-heuristics are used in solving process. Specially, to empower the solution process, a hybrid method consists of simulated annealing and genetic algorithm is developed. The output results along with sensitivity analysis represent the capability of the model in taking to account the METRIC concepts in this type of supply chain problems. Meanwhile, the performance of developed hybrid Meta-heuristic method was checked and approved.

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ARTICLE INFO

Keywords:
Location-inventory-routing
Supply chain
Integrated supply chain management
METRIC approach
Genetic algorithm
Simulated annealing

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Article history:
Received 25 December 2016
Revised 21 April 2017
Accepted 25 April 2017

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