

Effects of integration on the cost reduction in distribution network design for perishable products

ABSTRACT

Perishable products, which include medical and pharmaceutical items as well as food products, are quite common in commerce and industries. Developing efficient network designs for storage and distribution of perishable products plays a prominent role in the cost and quality of these products. This paper aims to investigate and analyze the impact of applying an integrated approach for network design of perishable products. For this purpose, the problem has been formulated as a mixed integer nonlinear mathematical model that integrates inventory control and facility location decisions. To solve the integrated model, a memetic algorithm (MA) is developed in this study. For verification of the proposed algorithm, its results are compared with the results of an adapted Lagrangian relaxation heuristic algorithm from the literature. Moreover, sensitivity analysis of the main parameters of the model is conducted to compare the results of the integrated approach with a decoupled method. The results show that as the products become more perishable, application of an integrated method becomes more reasonable in comparison with the decoupled one.