عنوان مقاله:

Designing an Integrated Production/Distribution and Inventory Planning Model of Fixed-life Perishable Products

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نویسندگان:

Javad Rezaeian - *Assistant Professor, Department of industrial engineering, Mazandaran University of Science and Technology, Babol, Iran*

keyvan Shokoufi - *MSc, Mazandaran University of Science and Technology, Iran*

Sepideh Haghayegh - *MSc, Mazandaran University of Science and Technology, Iran*

Iraj Mahdavi - *Professor, Mazandaran University of Science and Technology, Iran*

خلاصه مقاله:

This paper aims to investigate the integrated production/distribution and inventory planning for perishable products with fixed life time in the constant condition of storage throughout a two-echelon supply chain by integrating producers and distributors. This problem arises from real environment in which multi-plant with multi-function lines produce multi-perishable products with fixed life time into a lot sizing to be shipped with multi-vehicle to multi-distribution-center to minimize multi-objective such as setup costs between products, holding costs, shortage costs, spoilage costs, transportation costs and production costs. There are many investigations on production/distribution planning area with different assumptions. However, this research aims to extend this planning by integrating an inventory system in which for each distribution center, net inventory, shortage, FIFO system and spoilage of items are calculated. A mixed integer non-linear programming model (MINLP) is developed for the considered problem. Furthermore, a genetic algorithm (GA) and a simulated annealing (SA) algorithm are proposed to solve the model for real size applications. Also, Taguchi method is applied to optimize parameters of the algorithms. Computational characteristics of the proposed algorithms are examined and tested using t-tests at the 95% confidence level to identify the most effective meta-heuristic algorithm in terms of relative percentage deviation (RPD). Finally, Computational results show that the GA outperforms SA although the computation time of SA is smaller than the GA.

کلمات کلیدی:

Production/distribution and inventory planning, Perishable product, Multi-objective, Mixed integer non-linear programming, Genetic algorithm