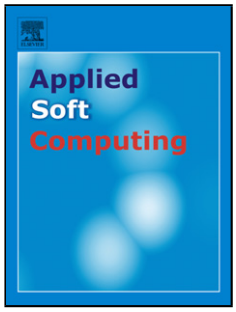

Title: A multi-agent approach to the integrated production scheduling and distribution problem in multi-factory supply chain

Author: Ali Gharaei Fariborz Jolai

PII: S1568-4946(18)30051-6
DOI: https://doi.org/doi:10.1016/j.asoc.2018.02.002
Reference: ASOC 4692

To appear in: *Applied Soft Computing*

Received date: 8-10-2017
Revised date: 16-12-2017
Accepted date: 2-2-2018

Please cite this article as: Ali Gharaei, Fariborz Jolai, A multi-agent approach to the integrated production scheduling and distribution problem in multi-factory supply chain, *<![CDATA[Applied Soft Computing Journal]]>* (2018), https://doi.org/10.1016/j.asoc.2018.02.002

A multi-agent approach to the integrated production scheduling and distribution problem in multi-factory supply chain

Ali Gharaei[a], Fariborz Jolai[a,*]

[a]*School of Industrial Engineering, College of Engineering, University of Tehran, Tehran, Iran*

Abstract

Research on the integrity of supply chain decisions is constantly increasing. One of the most interesting topics is the integration in production scheduling and distribution decisions. However, there is little study when multiple agents affect the supply chain decisions. In multi-agent scheduling, when customers are considered as agents, each of them has its own jobs with specific objective and set of customers competes to process the jobs on the shared resources in the supply chain. This paper studies a multi-agent scheduling problem with distribution decisions in a multi-factory supply chain. To save the delivery cost, batch delivery is proposed. It means several jobs, even for different customers, can be distributed in one batch. Some jobs are scheduled to minimize total tardiness while total distribution cost must be minimized. A mixed linear integer programming formulation is proposed. Due to the complexity of the problem, a novel multi-objective based on decomposition which has been combined with bees algorithm is developed to achieve Pareto solutions. Two local searches have been used to improve the Solutions. To evaluate the algorithm, its performance has been compared with three well-known algorithms in the literature. The results of the study show that the proposed algorithm outperforms the other tested algorithms.

Keywords: Multi factory supply chain, Multi-agent scheduling, Batch delivery, MOEA/D-BA

1. Introduction

Due to increasing the global markets and the supply chain boundaries, decentralized supply chains have always been one of the interesting topics for industry and researchers. Multi-factory supply chains are a type of decentralized supply chain, which includes suppliers, manufacturers and customers who are geographically located in different places and can have different shapes of series, parallel and network. In the case of series, the upstream factory product is a raw material for the downstream factory, where it also, in turn, processes the product and sends it to the next plant to produce the final product. In parallel with identical factories, customers jobs are sent to the nearest factory and after processing, products are sent to customers location. Also, in parallel with non-identical factories, each plant produces its own product and the outputs of all these factories are sent to the assembly unit and then final products are sent to customers location. The network mode is a combination of the parallel and series mode in which there are some identical factories at each stage. Due to the distance, the cost and time of transportation for the transfer of materials and products among the factories, as well as between customers and factories, should be considered.

*Corresponding author Tel.: +98(021)88021067, P.O.Box: 11155/4563
Email address: fjolai@ut.ac.ir (Fariborz Jolai)