

Accepted Manuscript

A Constraint Programming Approach for Solving Unrelated Parallel Machine Scheduling Problem

Ridvan Gedik, Darshan Kalathia, Gokhan Egilmez, Emre Kirac

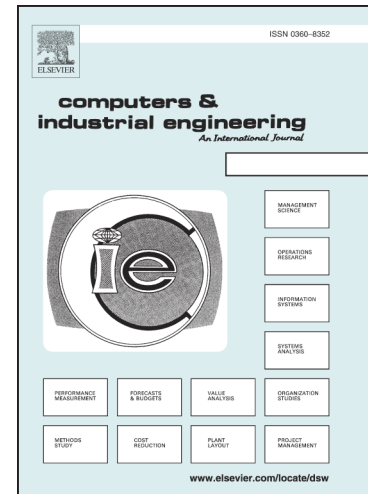
PII: S0360-8352(18)30215-8
DOI: <https://doi.org/10.1016/j.cie.2018.05.014>
Reference: CAIE 5220

To appear in: *Computers & Industrial Engineering*

Received Date: 17 May 2017
Accepted Date: 9 May 2018

Please cite this article as: Gedik, R., Kalathia, D., Egilmez, G., Kirac, E., A Constraint Programming Approach for Solving Unrelated Parallel Machine Scheduling Problem, *Computers & Industrial Engineering* (2018), doi: <https://doi.org/10.1016/j.cie.2018.05.014>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



A Constraint Programming Approach for Solving Unrelated Parallel Machine Scheduling Problem'

¹Ridvan Gedik*, ¹ Darshan Kalathia, ¹Gokhan Egilmez, ² Emre Kirac

¹Department of Mechanical and Industrial Engineering
University of New Haven, 300 Boston Post Rd, West Haven, CT 06516, USA

² Department of Engineering
University of Houston - Clear Lake, 2700 Bay Area Blvd. Houston, TX 77058 Delta
Annex 4, USA

Abstract

This paper addresses the non-preemptive unrelated parallel machine scheduling problem (PMSP) with job sequence and machine dependent setup times. This is a widely seen NP-hard (non-deterministic polynomial-time) problem with the objective to minimize the makespan. This study provides a novel constraint programming (CP) model with two customized branching strategies that utilize CP's global constraints, interval decision variables, and domain filtering algorithms. The performance of the CP model is evaluated against the state-of-art algorithms. In addition, we compare the performance of the default branching method in the CP solver against the two customized variants. In terms of average solution quality, the computational results indicate that the CP model slightly outperforms all of the state-of-art algorithms in solving small problem instances, is able to prove the optimality of 283 currently best-known solutions. It is also effective in finding good quality feasible solutions for the larger problem instances.

Keywords: Unrelated parallel machine scheduling, constraint programming, interval variables, sequence dependent setup times, machine dependent setup times

*Corresponding Author: Email: rgedik@newhaven.edu, Tel: +1 (203) 932-1167

Download English Version:

<https://daneshyari.com/en/article/7541069>

Download Persian Version:

<https://daneshyari.com/article/7541069>

[Daneshyari.com](https://daneshyari.com)