Proceedings of the 2010 International Conference on Industrial Engineering and Operations Management
Dhaka, Bangladesh, January 9 – 10, 2010

Minimizing Makespan in Flowshops with Bounded Processing Times

Ali Allahverdi
Department of Industrial and Management Systems Engineering
College of Engineering and Petroleum
Kuwait University, P.O. Box 5969, Safat, Kuwait

Harun Aydilek
Department of Natural Sciences and Mathematics
Gulf University for Science and Technology
P.O. Box 7207, Hawally 32093, Kuwait

Abstract

The two-machine flowshop scheduling problem of minimizing makespan is addressed where jobs have random processing times which are bounded within certain intervals. The probability distributions of job processing times within intervals are not known. The only known information about job processing times is the lower and upper bounds. The decision about a solution of the problem, i.e., finding a sequence, has to be made based on these bounds. Different heuristics using the bounds are proposed, and the proposed heuristics are compared based on randomly generated data. The computational analysis has shown that three of the proposed heuristics perform well with an overall average error of less than one percent. Moreover, for symmetric distributions, it has also shown that one of the heuristics, which applies Johnson's algorithm to the average of the lower and upper bounds, perform as the best with an overall average percentage error of 0.71. The obtained results are also shown to be consistent with the recent results obtained in the literature.

Keywords
Scheduling, flowshop, makespan, random and bounded processing times.