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IIM> Vol.2 No.3, March 2010

OPEN ACCESS

Efficient Heuristic to Minimize Makespan in Single Machine Scheduling Problem with Unrelated Parallel Machines

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ABSTRACT

This paper discusses an efficient heuristic to minimize the makespan of scheduling n independent jobs on m unrelated parallel machines. The problem of scheduling the jobs on the unrelated parallel machines is combinatorial in nature. Hence, the heuristic approach is inevitable for quicker solution. In this paper, a simple and efficient heuristic is designed to minimize the makespan of scheduling n independent jobs on m unrelated parallel machines. A mathematical model is also presented for this problem. A factorial experiment is used to compare the results of the proposed heuristic with that of a mathematical model by taking " Method" (Heuristic and Model) as the first factor and " Problem Size" (No. of machines X No. of Jobs: 2X5, 2X6, ..., 2X9, 3X5, 3X6, ..., 3X9, ..., 5X5, 5X6, ...5X9) as the second factor. It is found that there is no significant difference between the results of the proposed heuristic and that of the mathematical model. Further, the mean percent error of the results obtained by the heuristic from the optimal results obtained by the model is 2.336 %. The heuristic gives optimal solution for 76.67 % of the problems.

KEYWORDS

Makespan, Heuristic, Unrelated Parallel Machines, Mathematical Model, ANOVA

Cite this paper

P. Sivasankaran, T. Sornakumar and R. Panneerselvam, "Efficient Heuristic to Minimize Makespan in Single Machine Scheduling Problem with Unrelated Parallel Machines," *Intelligent Information Management*, Vol. 2 No. 3, 2010, pp. 188-198. doi: 10.4236/iim.2012.23022.

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