Abstract

In this paper a Genetic Algorithm (GA) approach is presented to solve the N-Jobs M-Machines Permutation Flow-Shop Scheduling Problem (PFSP) with Break-down times. In comparison with other methods that start with a solution obtained with the Johnson's Algorithm (or another greedy approach), the presented GA method starts with randomly generated solutions and within 100 iterations is able to obtain a solution better than other methods. Also, while in other works the sequence of jobs to be processed in the machines is obtained prior to the occurrence of break-down times, the GA finds the solution considering from the beginning the occurrence of the break-down times. Thus, the presented GA method considers the effect of the break-down times in the overall process. A selection of standard 20×20 PFSPs was used for validation of the GA, finding that in 86% of the selected PFSPs the GA was able to provide
job sequences with better makespans when compared with another method. The makespan improvements were statistically significant at the 0.10 and 0.01 levels. Then, evaluation of the GA was performed on one PFSP case with break-down times. As in the validation cases with standard PFSPs, the GA outperformed the results obtained with another method.

References

- Cerrolaza, M. and Annicchiarico, W. 1996. Algoritmos de optimización estructural
An Evolutionary Approach for Solving the N-Jobs M-Machines Permutation Flow-Shop Scheduling Problem with Break-Down Times

basados en simulación genética. U. C. V. -Consejo de Desarrollo Científico y Humanístico, Caracas.


Index Terms

Computer Science  Algorithms

Keywords