

# A Genetic Algorithm Approach for Unrelated Parallel-Machine Scheduling Problems with Dividable Jobs

Student : Ya-Chiao Fan

Advisor : Dr. Chi-Yang Tsai

Institute of Industrial Engineering and Management  
Yuan-Ze University

## ABSTRACT

Parallel-machine scheduling has been one of the important research fields of scheduling problems in recent years. It is a difficult combinatorial optimization problem. Except for few cases, this kind of problems belongs to NP-hard problems which require considerable time and resources to find optimal solutions. This research considers parallel-machine scheduling problems where jobs can be divided into stages and do not require continuous process. An unrelated parallel-machine scheduling model with dividable jobs, sequence-dependence setup times, and non-zero arrival times, is constructed and the objective is to minimize total absolute lateness.

This research applies Genetic Algorithm Approach on the considered scheduling problem. The Genetic Algorithm has parallel searching functions and capability to avoid partial optimal solution. Numerical experiment containing various test problems with real case data of the PSA process from a Polarizer manufacturing factory is conducted to evaluate the performance of the proposed algorithm. It is the aim of this research that the results can be of valuable to industries and follow-up research.

Keyword: genetic algorithm   unrelated parallel-machine   scheduling   sequence dependent   dividable jobs