

ABSTRACT

The Flexible Job-Shop scheduling problem is a continuation and extension of the classic Job-Shop scheduling problem. Flexible Job-Shop is widely applied in industries, such as in semiconductor manufacturing, automobile assembly, and textiles, where a group of machines are used to perform a single operation. Flexible Job-Shop is currently a common scheduling model in modern industrial environments, but often due to the high level of complexity optimization needs to be done to reduce conflicts between these production lines.

Therefore, in this study it will be investigated whether the Genetic Algorithm can be used to solve problems in the Flexible Job-Shop and can provide good optimization results. The expected output form of the system model in this study is the result of Flexible Job-Shop scheduling which provides the best optimization results according to processing time (makespan), the number of Genetic Generations, and the time required by the Genetic Algorithm to get the results, which are then displayed. in the form of a Gantt chart.

In this study, a scheduling simulation of the Flexible Job-Shop case was carried out by applying the Genetic Algorithm. The simulation gives optimization results as follows, namely makespan equal to 29 hours obtained in 200 generations and simulation time is 241.49 seconds. This result is better than without using Genetic Algorithm, which makespan equal to 51 hours.

Key Words: *Job-Shop, Flexible Job-Shop, Genetic Algorithm, Optimization, Gantt Chart.*