

# OPTIMIZATION OF FLOW SHOP SCHEDULING THROUGH A HYBRID GENETIC ALGORITHM FOR MANUFACTURING COMPANIES

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## Abstract.

A task scheduling problem is a process of assigning tasks to a limited set of resources available in a time interval, where certain criteria are optimized. In this way, the sequencing of tasks is directly associated with the executability and optimality of a preset plan and can be found in a wide range of applications, such as: programming flight dispatch at airports, programming production lines in a factory, programming of surgeries in a hospital, repair of equipment or machinery in a workshop, among others. The objective of this study is to analyze the effect of the inclusion of several restrictions that negatively influence the production programming in a real manufacturing environment. For this purpose, an efficient Genetic Algorithm combined with a Local Search of Variable Neighborhood for problems of  $n$  tasks and  $m$  machines is introduced, minimizing the time of total completion of the tasks. The computational experiments carried out on a set of problem instances with different sizes of complexity show that the proposed hybrid metaheuristics achieves high quality solutions compared to the reported optimal cases.

## Keywords

Hybrid genetic algorithm, Scheduling, Flow shop, Variable neighborhood search