

Benders Decomposition Approach to Solve the Hybrid Flow Shop Scheduling Problem

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Abstract : Hybrid flow shop scheduling problem (HFS) contains sequencing in a flow shop where, at any stage, there exist one or more related or unrelated parallel machines. This production system is a common manufacturing environment in many real industries, such as the steel manufacturing, ceramic tile manufacturing, and car assembly industries. In this research, a mixed integer linear programming (MILP) model is presented for the hybrid flow shop scheduling problem, in which, the objective consists of minimizing the maximum completion time (makespan). For this purpose, a Benders Decomposition (BD) method is developed to solve the research problem. The proposed approach is tested on some test problems, small to moderate scale. The experimental results show that the Benders decomposition approach can solve the hybrid flow shop scheduling problem in a reasonable time, especially for small and moderate-size test problems.

Keywords : hybrid flow shop, mixed integer linear programming, Benders decomposition, makespan

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