

Improved Methods for
Scheduling Partially Ordered Jobs Under Resource Constraints

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Thesis Abstract

One of the most widely studied problems in the area of job scheduling is the Resource Constrained Project Scheduling Problem (RCPS). A project consists of a set of activities partially ordered by precedence constraints. An activity has a given non-negative duration and uses different types of renewable resources such as manpower and machinery. The total number of available units of each resource type is constant and specified in advance. A unit of resource cannot be shared by two activities. An activity is ready to be processed only when all its predecessor activities are completed and the numbers of units of the various resource types required by it are free and can be allocated to it. Once started an activity is not interrupted and runs to completion. The objective is to assign start times to the activities so that the total project length (makespan) is minimized. Instead of the makespan, other regular measures can also be minimized. Examples of such measures are mean flowtime, maximum tardiness, and the number of tardy jobs.