

Performance and Schedule Patterns of Periodic Job Shops

이태억 (KAIST 산업공학과)

Marc E. Posner

(Industrial and Systems Engineering,
The Ohio State University, Columbus)

We consider the periodic job shop scheduling problem, a problem where an identical mixture of items, called a minimal part set (MPS), is repetitively produced for a given processing sequence, the performance and behavior of schedules are discussed. Two basic performance measures, cycle time and makespan, are considered. The minimum cycle time is identified as a circuit measure in a directed graph. It is shown that there exists a class of schedules that minimizes cycle time and repeats an identical timing pattern every MPS. We present an efficient algorithm to construct such schedules, and consider how to minimize the makespan of the schedule as a secondary objective. We show that minimizing the makespan as a secondary criterion, minimizes several other performance measures.

For makespan minimization, we examine earliest starting schedules where each operation starts as soon as possible. We characterize the cases where after a finite number of MPSs the earliest starting schedule repeats an identical timing pattern every fixed number of MPSs. We also develop a modification to the earliest starting schedule that repeats an identical timing pattern every MPS when the beginning operations on the machines can be delayed.