Selected Deterministic Scheduling Problems with Limited Machine Availability

Piotr FORMANOWICZ

Poznań University of Technology, Institute of Computing Science
ul. Piotrowo 3a, 60-965 Poznań, Poland
and
Polish Academy of Sciences, Institute of Bioorganic Chemistry
ul. Noskowskiego 12/14, 61-704 Poznań, Poland
e-mail: Piotr.Formanowicz@cs.put.poznan.pl

Abstract. In the paper selected results on scheduling problems with limited machine availability are presented. In the deterministic scheduling theory it is usually assumed that machines are continuously available during a planning horizon. Since this assumption is often not fulfilled in reality, there is a need to analyze models assuming that machines are not available for processing jobs in some periods of time. In the paper, we analyze single and parallel machine systems and also dedicated machine environments where such periods are known in advance. Computational complexity analysis showed that problems of this type are very often intractable. We propose polynomial time exact algorithms for some easy problems and heuristic approaches for selected hard problems. A branch and bound approach is also proposed for scheduling jobs in two-machine flow shop system.

Key words: scheduling theory, limited machine availability, two-phase method, computational complexity