Scheduling Due Dates Assignment with Simultaneous Considerations of Time-Dependent and Position-Dependent Deterioration Effects and Deteriorating Maintenance on a Single Machine

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Abstract

The due date assignment has been popular issues related to the interaction between various participants of the supply chain. In this paper, we investigate single machine due dates assignment scheduling problems with deterioration effects and deteriorating maintenance simultaneously. In the proposed model, the actual processing time of a job is not only dependent on the job's scheduled position, it also depends on the time expended by the jobs already processed. To counteract the deterioration effects of the machine, we assume that at most one maintenance is allowed throughout the scheduling horizon. The common due date assignment model and the slack due date assignment model are examined, respectively. The goal is to determine jointly the optimal due dates, the optimal maintenance position, and the optimal schedule to minimize the total penalty function based on earliness, tardiness and due dates. We show that all the problems studied can be optimally solved in polynomial time algorithms.

Keywords: Scheduling, common due date assignment, slack due date assignment, deterioration effects, deteriorating maintenance.