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Summary: This paper considers a single-machine scheduling and due date assignment problem in which the processing time of a job depends on its position in a processing sequence and jobs can be rejected by incurring penalties. The objective is to minimize the sum of the scheduling criterion of the accepted jobs and the total penalty of the rejected jobs. We first consider the problem with the common due date assignment method where the scheduling criterion is a cost function that includes the costs of earliness, tardiness, and due date assignment. We provide a polynomial-time algorithm to solve the problem. We then provide a unified model for solving the single-machine scheduling problem with rejection and position-dependent processing times. Finally, we extend the results to the setting involving various due date assignment methods.

MSC:
90B35 Deterministic scheduling theory in operations research
90C26 Nonconvex programming, global optimization

Keywords:
scheduling; single machine; rejection; position-dependent processing times; due date assignment

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References:
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