

## **Early-Tardy Minimization for Joint Scheduling of Jobs and Maintenance Operations on a Single Machine**

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**Abstract**—In this paper, we consider joint scheduling of jobs and preventive maintenance operations on a single machine with an objective to minimize the total earliness and tardiness of jobs about a common due date. The properties of an optimal schedule are identified and utilized to develop a constructive heuristic and a lower bound estimate. The properties are also utilized to hybridize Tabu search and Simulated Annealing algorithms. A numerical study with over 3200 randomly generated problems is reported to demonstrate the performance of the proposed solution methods. The study shows that the effectiveness of the proposed lower bound and constructive heuristic is sensitive to maintenance related parameters. We also show that hybridized Tabu search and Simulated Annealing algorithms are efficient approaches to solve the problem.

**Keywords**—Single machine scheduling, Maintenance, Early-Tardy, Common due date, Tabu search and simulated annealing

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