A Hybrid Model of Goal, Integer and Constraint Programming for Single Machine Scheduling Problem with Sequence Dependent Setup Times: A Case Study in Aerospace Industry

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Abstract : Scheduling problems are one of the most fundamental issues of production systems. Many different approaches and models have been developed according to the production processes of the parts and the main purpose of the problem. In this study, one of the bottleneck stations of a company serving in the aerospace industry is analyzed and considered as a single machine scheduling problem with sequence-dependent setup times. The objective of the problem is assigning a large number of similar parts to the same shift -to reduce chemical waste- while minimizing the number of tardy jobs. The goal programming method will be used to achieve two different objectives simultaneously. The assignment of parts to the shift will be expressed using the integer programming method. Finally, the constraint programming method will be used as it provides a way to find a result in a short time by avoiding worse resulting feasible solutions with the defined variables set. The model to be established will be tested and evaluated with real data in the application part.

Keywords : constraint programming, goal programming, integer programming, sequence-dependent setup, single machine scheduling