The optimality box in uncertain data for minimizing the sum of the weighted completion times of the given jobs

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2017 г.

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Keywords: Single-machine scheduling, Uncertain processing times, Optimality box.

Abstract: An uncertain single-machine scheduling problem is considered, where the processing time of a job can take any real value from a given segment. The criterion is to minimize the total weighted completion time of the n jobs, a weight being associated with each given job. We use the optimality box as a stability measure of the optimal schedule and derive an O(n)-algorithm for calculating the optimality box for a fixed permutation of the given jobs. We investigate properties of the optimality box using blocks of the jobs. If each job belongs to a single block, then the largest optimality box may be constructed in O(n log n) time. For the general case, we apply dynamic programming for

constructing a job permutation with the largest optimality box. The computational results for finding a permutation with the largest optimality box show that such a permutation is close to an optimal one, which can be determined after completing the jobs when their processing times became known.

Published in: Magdeburg, 2017. – 23 p. – (Preprint / Otto-von-Guericke-Universitet; №1)