An Approach to the Assembly Line Balancing Problem with Uncertain Operation Time

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Abstract : The assembly line balancing problems are signficant in mass production systems. In order to deal with the uncertainties that practically exist but barely mentioned in the literature, this paper develops a mathematic model with an optimisation algorithm to solve the assembly line balancing problem with uncertainty operation time. The developed model is able to work with a variable number of workstations under the uncertain environment, aiming to obtain the minimal number of workstation and minimal idle time for each workstation. In particular, the proposed approach first introduces the concept of protection time that closely works with the uncertain operation time. Four dominance rules and the mechanism of determining up and low bounds are subsequently put forward, which serve as the basis for the proposed branch and bound algorithm. Experimental results show that the proposed work verified on a benchmark data set is able to solve the uncertainties efficiently.

Keywords : assembly lines, SALBP-UOT,uncertain operation time, branch and bound algorithm.
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