

TASK ALLOCATION IN PRODUCTION SYSTEMS USING FIREFLY ALGORITHM

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ABSTRACT

The assembly line process has been widely used by most manufacturing industries all over the world. In the production systems, the workpieces of the products will be assembled in line and passed through several workstations before they turn into finished products. However, there exists a problem in the assembly line process by which the management always deal with unbalancing of the assembly work among the workstations. It is hard for the management to optimize the number of workstations without violating the restriction of the line such as precedence relations among the task. Therefore, from the above matter, this study will solve the Simple Assembly Line Balancing Problem Type 1 (SALBP-1) by minimizing the number of workstations to complete all tasks based on the given cycle time and task time using firefly algorithm. Hence, the number of tasks assigned for each workstation is determined where the total task time for each workstation will not exceeding the cycle time. Based on the result obtained, it shows that the optimal number of workstations needed for 9 tasks is 4 and the total task time for each workstation is not exceeding 10 minutes. As for the recommendation, other metaheuristic and the trend for algorithm hybridization can be applied with the aims of minimizing the number of workstation for SALBP-1.

Keywords: Assembly line, production, SALBP-1, firefly algorithm.