Universiti Teknologi MARA

Task Allocation in Production Systems Using Firefly Algorithm

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STUDENT'S DECLARATION

I certify that this report and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

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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. Thus, 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.

TABLE OF CONTENTS

CONTENTS		PAGE
SUPERVISOR'S APPROVAL		ii
DECLARATION		iii
ACKNOWLEDGEMENT		iv
ABSTRACT		v
TABLE OF CONTENTS		vi
LIST OF FIGURES		viii
LIST OF TABLES		ix
LIST OF ABBREVIATIONS		x
CHAPTER ONE: INTRODUCTION		
1.1	Background of the Study	1
1.2	Problem Statement	3
1.3	Objective of the Study	3
1.4	Scope of the Study	3
1.5	Significance of the Study	3
1.6	Summary	4
CHAPTER TWO: LITERATURE REVIEW		
2.1	Assembly Line Balancing Problem (ALBP)	5
2.2	Simple Assembly Line Balancing Problem Type 1 (SALBP-1)	7
2.3	Firefly Algorithm (FA)	8
	2.3.1 Basic Concept	8
	2.3.2 Application of Firefly Algorithm (FA) in Optimization	9
2.4	Summary	10

CHAPTER THREE: RESEARCH METHODOLOGY

3.1	Data Collection	11
3.2	Formulation of Simple Assembly Line Balancing Problem Type 1 (SALBP-1)	11
3.3	Firefly Algorithm (FA)	13
	3.2.1 Pseudocode of Firefly Algorithm (FA)	15
	3.2.2 Flowchart of Firefly Algorithm (FA)	16
	3.2.3 Basic Steps in Firefly Algorithm (FA)	17
3.4	Method Validation	18
3.5	Summary	18

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1	Data Analysis	19
4.2	Results and Discussions	21
4.3	Comparison Results between Particular Equation and Calculation and Firefly Algorithm	22
4.4	Summary	22

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1	Conclusion	23
5.2	Recommendation	23

REFERENCES 25