

**Universiti Teknologi MARA**

**Adjusted 0-1 Knapsack Problem in  
Cargo Flow by using Artificial Bee  
Colony 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**

This research describes the problem with the knapsack that occurred in the cargo flow. The problem of the knapsack is the problem of optimisation used to illustrate the problem and the solution in which each set of items has its own specific value and weight. With its total value as much as possible, the number of items that may become less or at least equal to or equal to the limit. The aim of this research is to determine the flow of the shipment based on volume and to determine the total cost based on the flow of shipment by using Artificial Bee Colony (ABC) algorithm. The ABC algorithm consists of four phases of initialisation, employed bees, onlooker bees and scout bees. Data are obtained from Lin et al (2017). There are 30 shipments included in this research and shipments can start with any number of shipments. The result shows, the shipment starts with a Shipment 25 which the volume is 2 560 000 tons per year with cost 0.111 tons per km and ends with a Shipment 21 which volume is 2 250 000 tons per year with cost 0.129 tons per km. The flow volume of the shipment can be defined for the purpose of the finding. Next result for the total cost of the shipment is 402.377 tons per km.

Keywords: Knapsack problem, flow volume, total cost, ABC algorithm

# TABLE OF CONTENTS

<b>CONTENTS</b>	<b>PAGE</b>
<b>SUPERVISOR'S APPROVAL</b>	ii
<b>DECLARATION</b>	iii
<b>ACKNOWLEDGEMENT</b>	iv
<b>ABSTRACT</b>	v
<b>TABLE OF CONTENTS</b>	vi
<b>LIST OF FIGURES</b>	viii
<b>LIST OF TABLES</b>	ix
 <b>CHAPTER ONE: INTRODUCTION</b>	
1.1 Background of the Knapsack Problem	1
1.2 Problem Statement	3
1.3 Objective of the Study	4
1.4 Scope of the Study	4
1.5 Significance of the Study	4
1.6 Summary	5
 <b>CHAPTER TWO: LITERATURE REVIEW</b>	
2.1 Related Works on Knapsack Problem	6
2.2 Artificial Bee Colony Algorithm	7
2.3 Improved Artificial Bee Colony Algorithm	9
2.3 Summary	11

### **CHAPTER THREE: RESEARCH METHODOLOGY**

3.1	Method of Data Collection	12
3.2	Mathematical Model	12
3.3	Artificial Bee Colony Algorithm	13
3.4	Summary	20

### **CHAPTER FOUR: RESULTS AND DISCUSSIONS**

4.1	Data Collection	21
4.2	Artificial Bee Colony in MATLAB	22
4.3	The Flow of The Shipment	25
4.4	The Total Cost of The Shipment	27
4.5	Summary	27

### **CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS**

5.1	Conclusions	28
5.2	Recommendations	29
5.3	Summary	29

<b>REFERENCES</b>	<b>30</b>
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