

TABLE OF CONTENTS

CERTIFICATE	i
APPROVAL SHEET	ii
CANDIDATE'S DECLARATION	iii
ACKNOWLEDGMENTS	v
ABSTRACT	vii
TABLE OF CONTENTS	ix
LIST OF FIGURES	xii
LIST OF TABLES	xv
LIST OF ABBREVIATION	xvii
1 INTRODUCTION	1
1.1 The Real-Time System.....	1
1.2 Type of Real-Time System	2
1.3 Type of Task in Real-Time System	3
1.4 Type of Scheduling Algorithm	4
1.5 Motivation for This Work	6
1.6 Problem Statement, Objectives, and Research Contribution	8
1.6.1 Problem Statement	8
1.6.2 Objectives	8
1.6.3 Research Contribution.....	9
1.6.4 Scope of Problem Statement	10
1.7 The Overall Organization of Thesis.....	10
2 LITERATURE STUDY AND RELATED WORK.....	13
2.1 The Dynamic Scheduling Algorithms.....	13
2.2 The Static Scheduling Algorithms	14
2.3 The Hybrid Scheduling Algorithms	15
2.4 The Swarm Intelligence based Scheduling Algorithms	16
3 SIMULATION ENVIRONMENT FOR RESEARCH WORK.....	20

3.1	The Performance Parameter.....	20
3.2	The Dataset	22
3.3	The Simulator.....	24
4	CRITICAL ANALYSIS OF STATIC AND DYNAMIC SCHEDULING ALGORITHMS	25
4.1	The Static Scheduling Algorithms	26
4.1.1	The Rate Monotonic (RM) Algorithm	26
4.1.2	The Shortest Job First (SJF) Algorithm	27
4.2	The Dynamic Scheduling Algorithms.....	28
4.2.1	The Earliest Deadline First (EDF) Algorithm.....	28
4.2.2	The Least Slack Time First (LST) Algorithm.....	28
4.3	Performance Analysis and Result Comparison.....	30
4.3.1	Underload Scenario.....	30
4.3.2	Overload Scenario.....	33
4.3.3	Highly Overload Scenario.....	35
4.4	Conclusion	38
5	HYBRID SCHEDULING ALGORITHM (S_LST).....	39
5.1	S_LST Algorithm.....	40
5.2	Performance Analysis and Result Comparison.....	41
5.2.1	Underload Scenario.....	42
5.2.2	Overload Scenario.....	44
5.2.3	Highly Overload Scenario.....	47
5.3	Conclusion	49
6	THEORETICAL PROOF FOR ACO BASED SCHEDULING ALGORITHM.....	51
6.1	ACO Based Scheduling	52
6.1.1	Creation of Tour.....	53
6.1.2	Update Pheromone Value	54
6.1.3	Selection of Task.....	55
6.1.4	Algorithm Key Points	56
6.2	ACO Based Scheduling Algorithm.....	58
6.3	Mathematical Proof for Algorithm	60
6.4	Conclusion	62
7	PROPOSED PSO BASED SCHEDULING ALGORITHM	63
7.1	Swarm Intelligence Techniques	65

7.2	Particle Swarm Optimization Technique	67
7.3	PSO Based Scheduling Algorithm	70
7.3.1	Initialization of Task as a Particle.....	71
7.3.2	Compute the velocity and position for each task	72
7.3.3	Analyze the position and velocity of each task	73
7.3.4	Selection of task for execution.....	74
7.3.5	The Algorithm.....	74
7.3.6	Convergence Analysis and Parameter Selection.....	76
7.4	Case Study for Instance of Task Set	79
7.5	Performance Analysis and Result Comparison.....	80
7.5.1	Underload Scenario.....	81
7.5.2	Overload Scenario.....	83
7.5.3	Highly Overload Scenario.....	85
7.5.4	Time Complexity Analysis	88
7.6	Conclusion	89
8	CONCLUSIONS AND ROAD MAP FOR THE FUTURE WORK	90
8.1	Conclusion	90
8.2	Road Map for the Future Work.....	93
	PUBLICATIONS.....	95
	REFERENCES	97