

## LIST OF FIGURES

Figure	Page
4.1 A basic facility system	26
4.2 Running time from running program at 50 and 70 facilities	32
4.3 Flow chart of proposed ant colony optimization algorithm	37
4.3 Flow chart of proposed ant colony optimization algorithm (continued)	38
4.4 Seeking $P_{best}$ for ACO algorithm	41
4.5 Finding the suitable $NC_{max}$	41
4.6 Find tune the suitable persistence of trail	42
4.7 Comparison % $RPD$ of running time between ACO and the optimal solution	45
4.8 Comparison % $RPD$ of total cost between ACO and the optimal solution	46
5.1 Simulated annealing algorithm	51
5.2 Simulated annealing algorithm on SSCFLP	56
5.2 Simulated annealing algorithm on SSCFLP (continued)	57
5.3 Frequency of each temperature factors that gives minimum cost	59
5.4 Initial temperatures that give the minimum cost	60
5.5 Final temperatures that give the minimum cost	60
5.6 Comparing of % $RPD$ cost of ACO, SA and Optimal Solution	62
5.7 Comparison of % $RPD$ time of ACO, SA and Optimal Solution	63
5.8 Average cost from running ACO compare with SA at 5 facilities	66
5.9 Average cost from running ACO compare with SA at 6 facilities	66
5.10 Average cost from running ACO compare with SA at 7 facilities	66
5.11 Average cost from running ACO compare with SA at 8 facilities	67
5.12 Average cost from running ACO compare with SA at 9 facilities	67
5.13 Average cost from running ACO compare with SA at 10 facilities	67
5.14 Average time from running ACO compare with SA at 5 facilities	69
5.15 Average time from running ACO compare with SA at 6 facilities	69
5.16 Average time from running ACO compare with SA at 7 facilities	69
5.17 Average time from running ACO compare with SA at 8 facilities	70
5.18 Average time from running ACO compare with SA at 9 facilities	70
5.19 Average time from running ACO compare with SA at 10 facilities	70