

## ABSTRACT

Traveling Salesman Problem (TSP) is a famous problem in combinatorial optimization. The objective of the TSP is to find the shortest path that reaches all the cities which are interconnected with each other by straight lines. The symmetric TSP is used and the distance between two cities is calculated by using Euclidean equation. In this study, three heuristic methods, namely simulated annealing (SA), tabu search (TS) and reactive tabu search (RTS) are used to solve TSP. SA is a generic probabilistic meta-algorithm for the global optimization problem and TS is a metaheuristic search technique that guides a local search procedure to explore the solution space beyond local optimality. RTS is an improved method of TS and it dynamically adjusts tabu list size based on how the search is performed. The performance of SA, TS and RTS algorithms in solving TSP with different size of problems are evaluated by using empirical testing, benchmarking solution and simple probabilistic analysis. The implementations of the three methods to solve TSP show that the RTS algorithm provides a better solution in terms of minimizing the objective function while SA algorithm is less time consuming in solving problem with large number of cities. In conclusion, RTS is more effective in producing good quality solution and on the other hand, SA may be used to obtain instant results.

**Keywords:** Traveling salesman problem; Simulated annealing; Tabu search; Reactive tabu search; Combinatorial optimization