

Abstract

Traveling Salesman Problem (TSP) is a classical problem of optimal routing for a number of n cities, with the rule that every city must be visited exactly once except the city early. Optimization is meant here is viewed from the distance.

Many alternatives are possible routes amounted to N permutation obtained from the equation $(N-1)! / 2$. For example the number of cities to be visited by some 15 cities ($N = 15$) then will get an alternate route around 653,837,184,000 route. For $N = 70$ then the alternative route will be selected around $8556 * 1097$ route. This means that for large N , the size of the problem also enlarges super-exponential.

Many heuristic methods that can be used to solve TSP problems, one of the Ant Colony System (ACS). ACS is part of the Ant Colony Optimization, which is an algorithm that is inspired by ant behavior in the real world at the time of the search process of eating.

In the process of calculation, ACS consists of three main phases namely initialization phase, the formation of a tour, and the phase of the global update. At the time of the election process in its path segments of the ants is strongly influenced by the intensity of pheromone and also by the distance between segments. Where the pheromone is used as a means of indirect communication. The higher the intensity of pheromone on the sides, the greater the probability of a segment to pass or selected.

Because the ACS method is a heuristic method, then there is no guarantee that the resulting solution was optimal. However, this method was chosen because a lot of time and cost relatively lower compared with non-heuristic methods.

For the results of the settlement by using Ant Colony System will also be compared with results from the methods of Simulated Annealing, Theory of Nearest Neighbor by 2-Opt and Gani Interaction Theory.