

A hybrid particle swarm optimization - simulated annealing algorithm for the probabilistic travelling salesman problem

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The Probabilistic Traveling Salesman Problem (PTSP) is a variation of the well known Traveling Salesman Problem (TSP). This problem arises when the information about customers demand is not available at the moment of the tour generation and/or the tour re-calculating cost is too elevated. In this article, a Hybrid Algorithm combining Particle Swarm Optimization (PSO) and Simulated Annealing (SA) is proposed, in order to solve the PTSP. The PSO heuristic offers a simple structured algorithm which supplies a high level of exploration and fast convergence, compared with other evolutionary algorithms. The SA algorithm is used to improve the particle diversity and to avoid the algorithm being trapped into local optimum. Two well-known benchmarks of the literature are used and the proposed PSO-SA algorithm obtains acceptable results. In fact, the hybrid algorithm improves the performance of simple PSO algorithm for all instances.

Hybrid algorithm

Metaheuristics

Routing problems

Stochastic optimization

Swarm intelligence