Metaheuristic Algorithms

Program – Local Search for the TSP

Mar 25, 2015

Objectives

Practice and get familiar with the way to solve problem by local search. In this assignment you need to make use of the taught subject matters about Local Search and Hill Climbing (ch. 3), Simulated Annealing (ch. 4), and Tabu Search (ch. 5).

Program

Design the following local search methods and write programs (in C/C++) to solve the **traveling salesman problem (TSP)**.

1. Hill climbing (HC).
2. Simulated annealing (SA).
3. Tabu search (TS).

Report

Execute your codes of HC, SA, and TS to solve three TSP instances (eil51, lin105, and pcb442)[1]. Each algorithm requires 20 runs for each instance.

1. List the five LS elements for your three methods.
2. List the parameter setting.
3. Compare their performance using the following measures:
   (a) **Average best tour length** over 20 runs for each method.
   (b) **Average running time** for the three methods to get a solution.
   (c) **Success rate** (SR) of the three methods. (eil51: 426, lin105: 14379, pcb442: 50778)

$$\text{SR} = \frac{\text{Number of times to get the optimal solution}}{\text{Number of trials}}.$$

Submission

- **2015/4/14 (degrade by 10 points for each day delay)**
- Source code (C/C++) + Report (2–4 pages in IEEE format)
- Zip (or rar) the files and **upload to eCourse system**

[1] please download the instances from eCourse.