

DM63 - Heuristics for Combinatorial Optimization Problems – Weekly Notes

Lecture 4, Fall 2006

Lecture September 28

We generalized the concepts of solution representation and neighborhood operator. We then defined the Search Landscapes and review how hard it is to compute distances within the different neighborhoods.

We started introducing Metaheuristics. Those presented at the lecture were Beam Search, GRASP and Variable Neighborhood Search.

In the exercise part, we introduced the Single Machine Total Weighted Tardiness Problem. We designed construction heuristics and iterative improvement procedures with special emphasis on the exploration and pruning of the neighborhood.

Bibliographical Notes

Some of the things treated in the first part of the lecture, like permutations and distances, are retrievable from this article: T. Schiavinotto and T. Stützle. A review of metrics on permutations for search landscape analysis Computers and Operation Research. 2006.

GRASP is described at page 89 of the book by Hoos and Stützle, Beam Search at page 455 of the book by Hoos and Stützle and Variable Neighborhood Search in the article 3 of the Notes.

In the next lecture we will deal with Search Landscape which is also treated in Chapter 5 of the Hoos and Stützle book.

Exercise

Consider an Iterative Best Improvement for solving the k -coloring problem under the approach k -fixed, complete improper colorings with one-exchange neighborhood. Determine the computational cost of evaluating all the solutions in the neighborhood at one step.