Algorithmic Methods for Mathematical Models (AMMM)
Lab Session 5 – GRASP and BRKGA Metaheuristics

In this fifth session we will focus on using the GRASP and the BRKGA meta-heuristics.

Tasks

In pairs, do the following tasks and prepare a lab report using the Python code that is provided.

a) GRASP:
- Prepare a pseudocode for the GRASP constructive algorithm. Specify the greedy function and the RCL.
- Tune parameter α. Generate at least 2 new random instances of medium size and run the constructive phase of GRASP for different values of α from 0-1 in steps of 0.1. For every value, run the algorithm at least three times and compute the average of the cost of the obtained solutions. Prepare plots with the obtained values. Find the best value of α and use it for the rest of experiments.

b) BRKGA
- Prepare a pseudocode for the BRKGA decoder algorithm. Specify how the chromosome is used.
- Study what is the best combination of BRKGA parameters (size of population, inheritance probability, elite set and mutant percentages).

c) Solve the same instances that you generated in the last lab session using:
- GRASP: Constructive phase only.
- GRASP: Constructive + Local search (do for all combinations)
- BRKGA

Configure the heuristics to stop after 10min and plot the quality of the solutions, the number of iterations performed, and time to solve against the size of the instances.

d) Compare the results with those obtained in the previous lab session using greedy + LS and CPLEX.