

EXERCISE 1 (TSP)

1) Implement the linear programming model of the Traveling Salesman Problem.

As shown in the script *Tsp.m*, the distance matrix can be generated with the function

```
function [cities, distances] = create_tsp(N_Cities, seed)
% Create a random map with N_cities using seed to init random numbers
% cities: two column matrix of type double with cities' coordinates
% distances: matrix with distances between each couple of cities
```

When you obtain a solution, you can visualize it using the function

```
function draw_tsp(cities, edges, obj)
%% Draw the TSP solution
% cities: two column matrix of type double with cities' coordinates
% edges: two column matrix of the selected edges (from->to)
```

Test increasing dimensions, to see the increase in time needed by the solver to solve the model. If you have it installed (or on LADISPE machines) you can try to run Gurobi instead of the solver included in Matlab, to see the difference between the solver performances.

2) Implement a Nearest Neighbor heuristic.

Begin by implementing the NN heuristic starting from a fixed note. Then, improve it with a multi-start technique (run N times starting from a different city and keep the best solution found). Compare the results with the model results.

THEN: time for questions about the program, the projects, etc.

EXERCISE 2 (if you still have time)

Optimally solve the Friends-Newspaper problem presented in the course slides.