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Assiment\_5

The main solution steps:

First, I create the class coordinate that take the two points and return its coordinate

Iam open the file and read line by line then spilt it and send x and y to class coordinate then save the coordinates to each city

Then with the function I calculate the distance between each node euclidean\_distance() by these function

Then I make the Eta matrix that divide 1 over every item in the distance

Then I to Calculate the tour length using nearest neighbor heuristic

by make the list visited which I will put on it the cities that I am visit then I start with the start node

And every time I will check if it is found on the visited list, I will not go to it else I will calculate its distance

And by these I will not make any cycle loop

I will sum the distance and calculate the tau

And from the tau I will calculate the phenomena

Then after that I will initiate random number of ants

Then I will iterate with the number of ants and for every ant I will generate initial point to start from it

And by check if it in found list or not I will make one ant in every point

Then I will calculate the total tour for every ant by for every node I move to it I will calculate the probability for the other node and move to the max probability

Then I calculate the total\_len for each ant

Then I update the phenomena.

The plots:



