

Evolutionary Computation - Assignment 8

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1 Description of the problem

We are given a graph with n nodes, each described by its x and y coordinates and a node cost. The goal is to select precisely $\lceil n/2 \rceil$ nodes that form a Hamiltonian cycle (closed path) and minimize

$$\sum_{e \in E} cost(e) + \sum_{v \in V} cost(v)$$

E is a set of selected edges, $cost(e)$ is Euclidean distance between two nodes rounded mathematically to an integer value, V is a set of selected nodes, and $cost(v)$ is node cost.

Now we perform global convexity tests for greedy solutions

2 Results

Instance	Best Coeff. edges	Best Coeff. nodes	Avg. Coeff. edges	Avg. Coeff. nodes
TSPA	-0.1036	-0.5789	-0.6626	-0.6012
TSPB	-0.0841	-0.513	-0.7036	-0.6493
TSPC	-0.1099	-0.46	-0.6015	-0.4954
TSPD	-0.1955	-0.565	-0.7116	-0.5024

3 Code

Implementation of algorithms and visualizations is available [here](#)

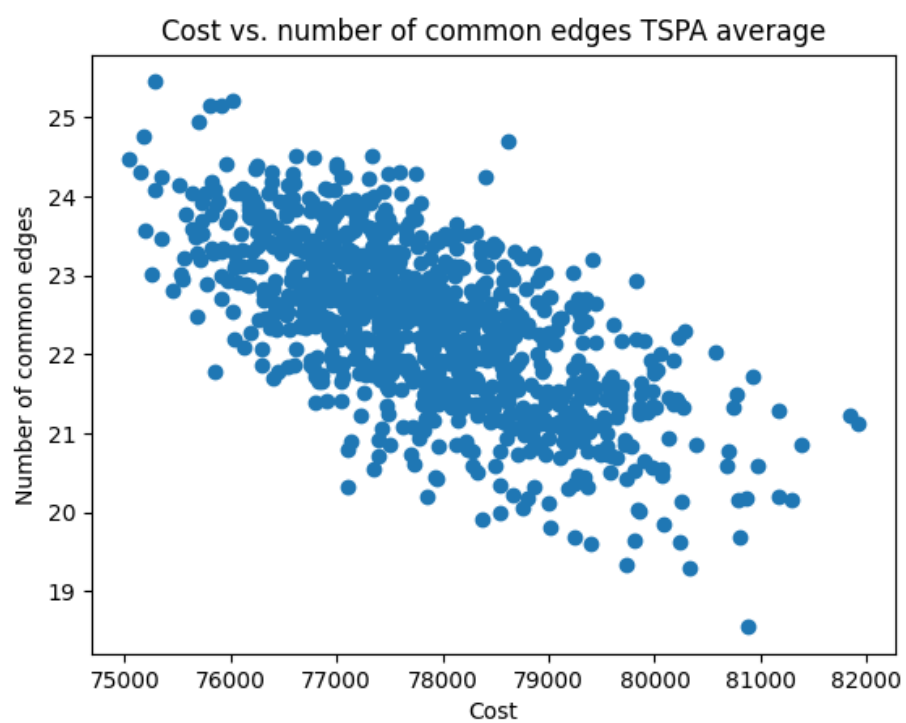


Figure 1: Average cost vs common edges for TSPA



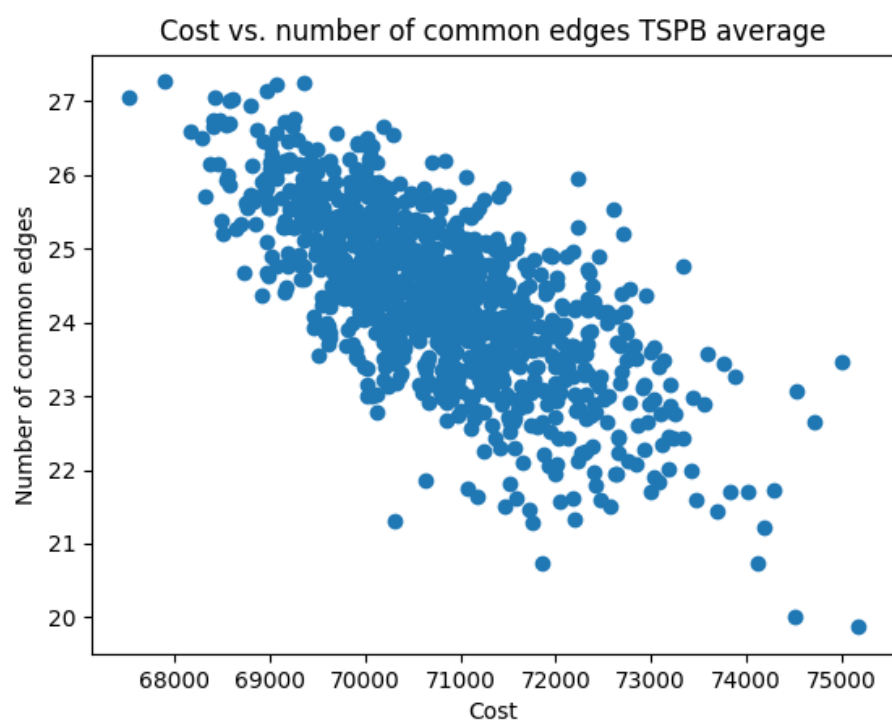


Figure 3: Average cost vs common edges for TSPB

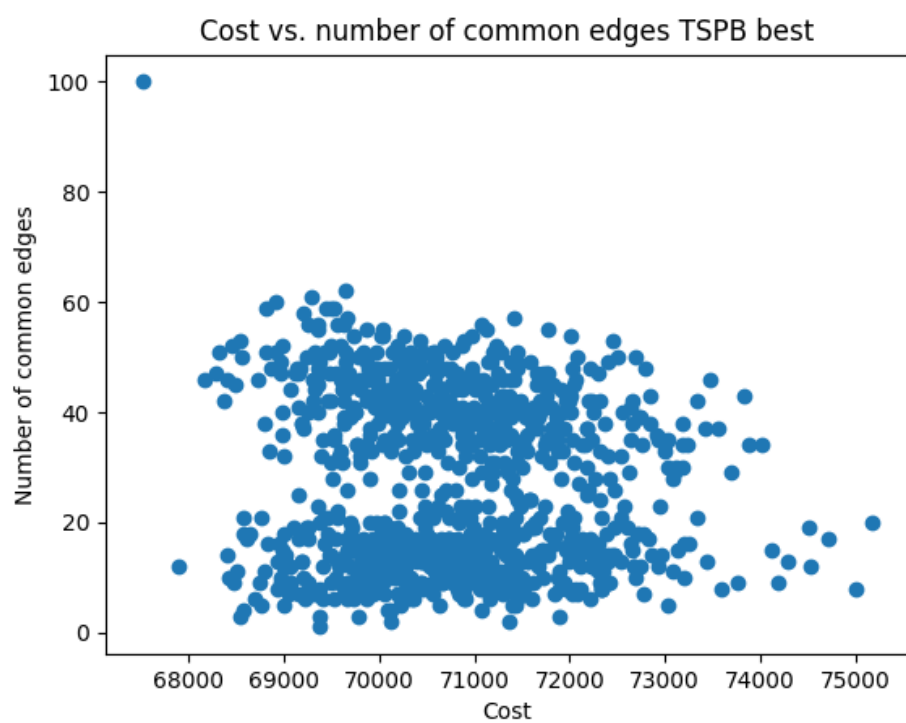


Figure 4: Best cost vs common edges for TSPB

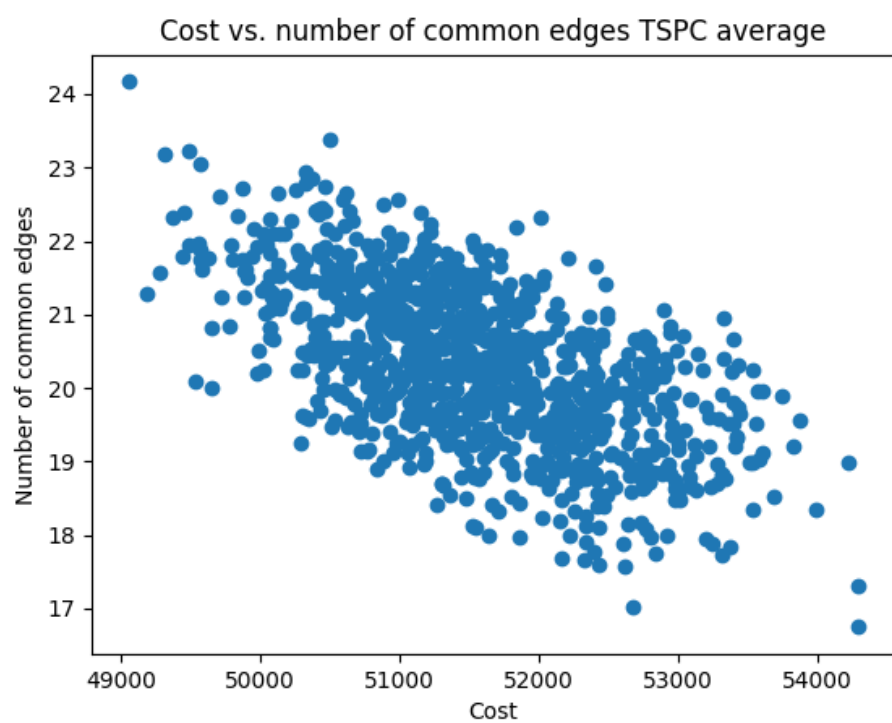


Figure 5: Average cost vs common edges for TSPC

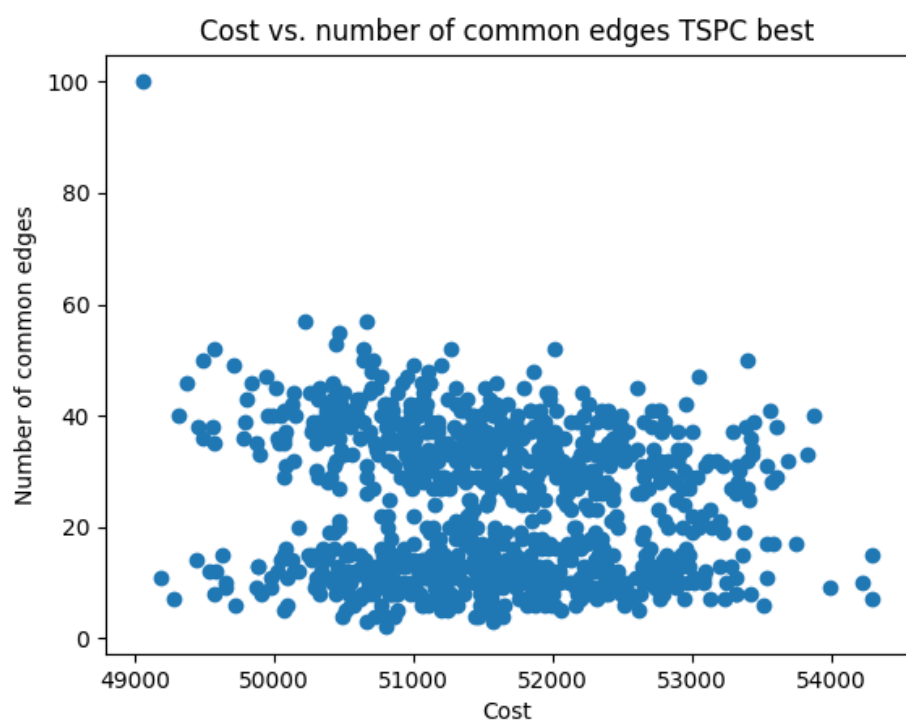


Figure 6: Best cost vs common edges for TSPC

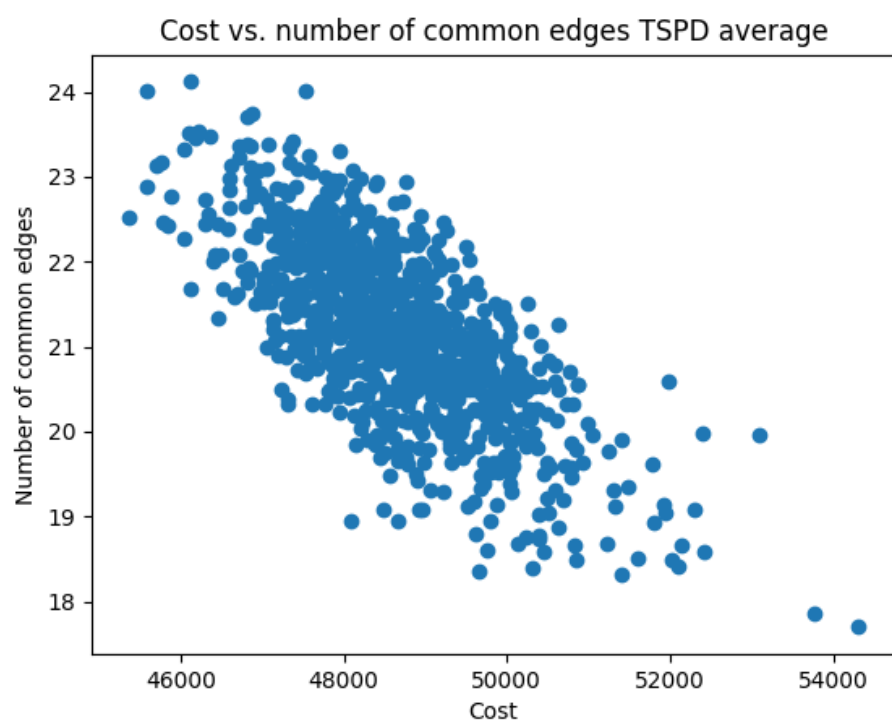


Figure 7: Average cost vs common edges for TSPD

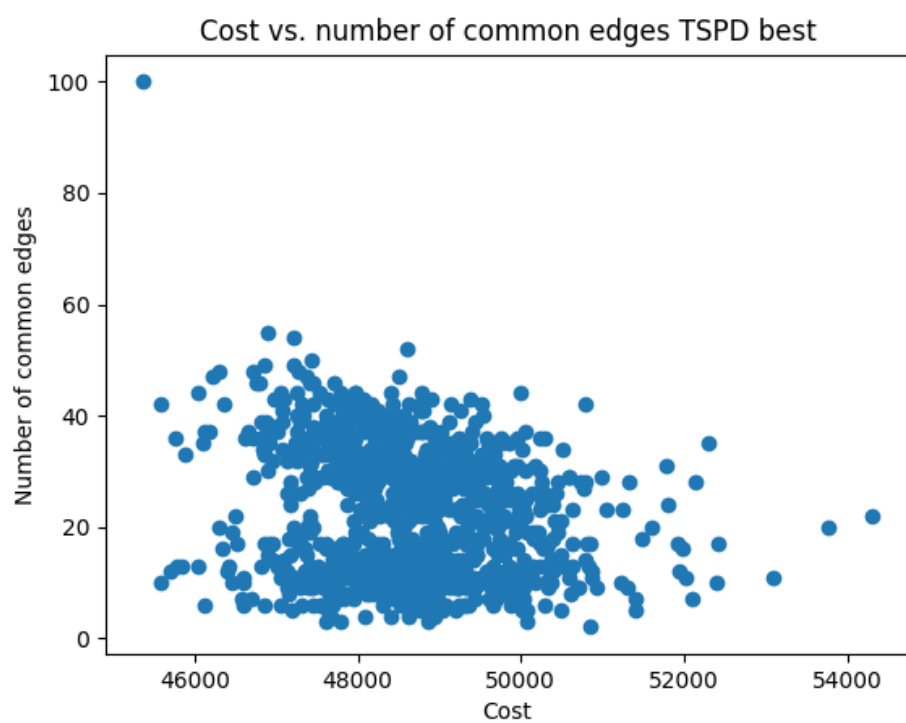


Figure 8: Best cost vs common edges for TSPD

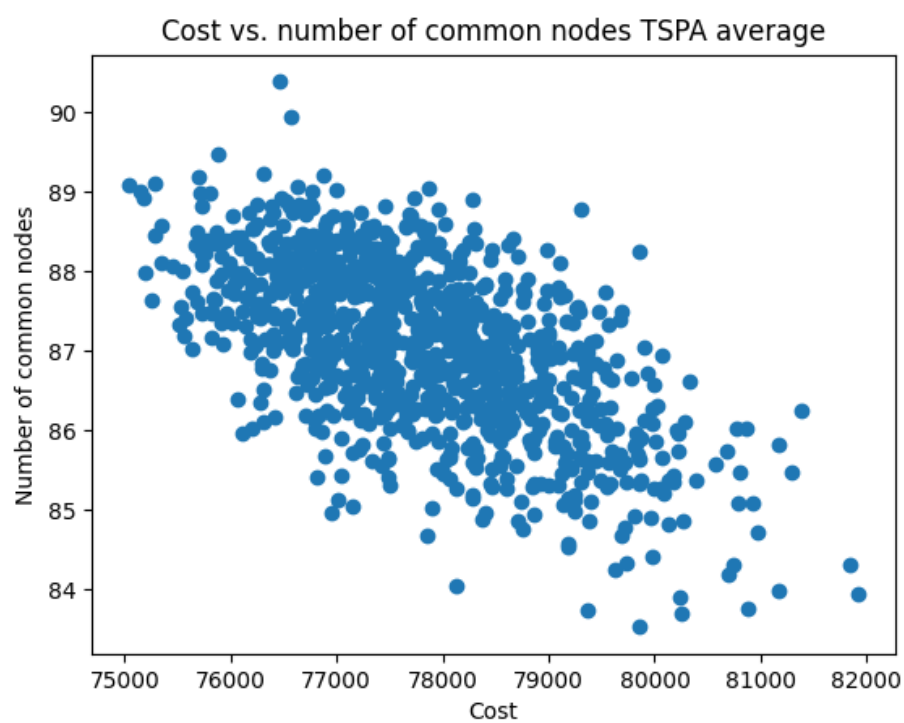


Figure 9: Average cost vs common nodes for TSPA

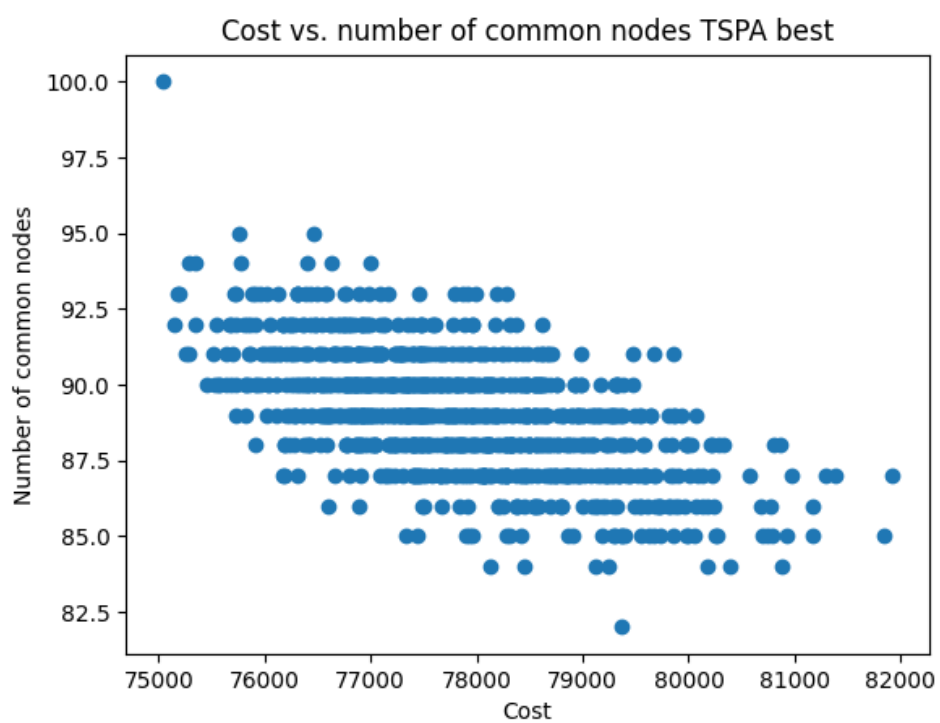


Figure 10: Best cost vs common nodes for TSPA

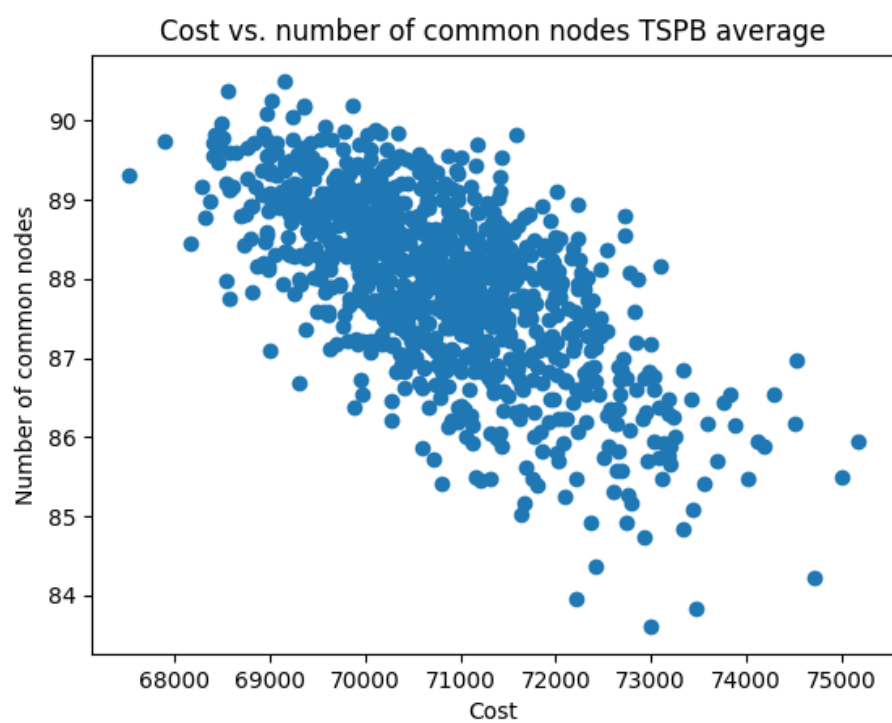


Figure 11: Average cost vs common nodes for TSPB

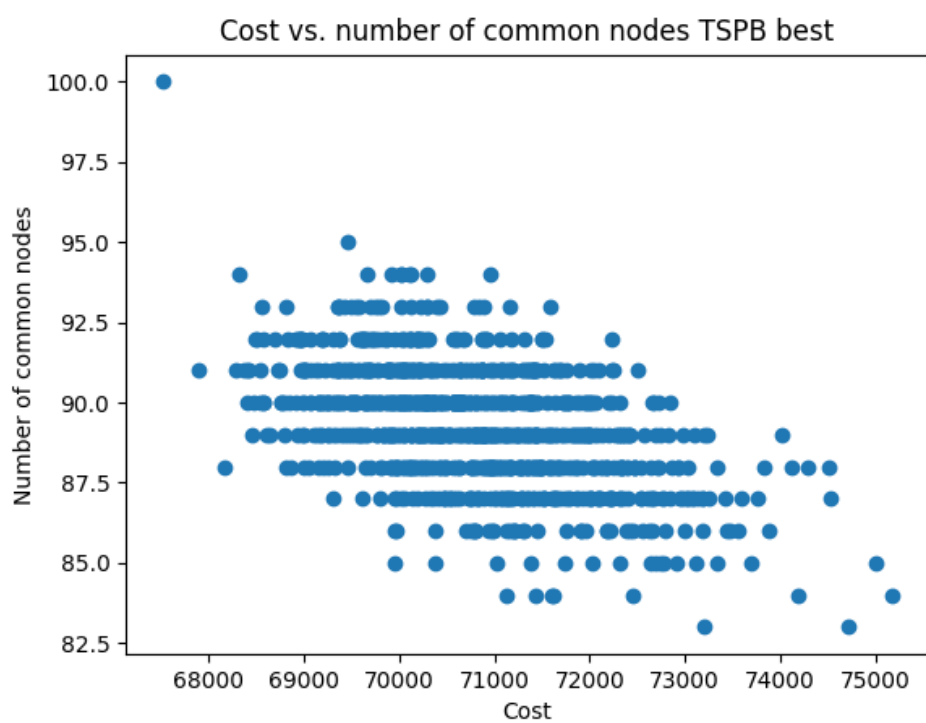


Figure 12: Best cost vs common nodes for TSPB

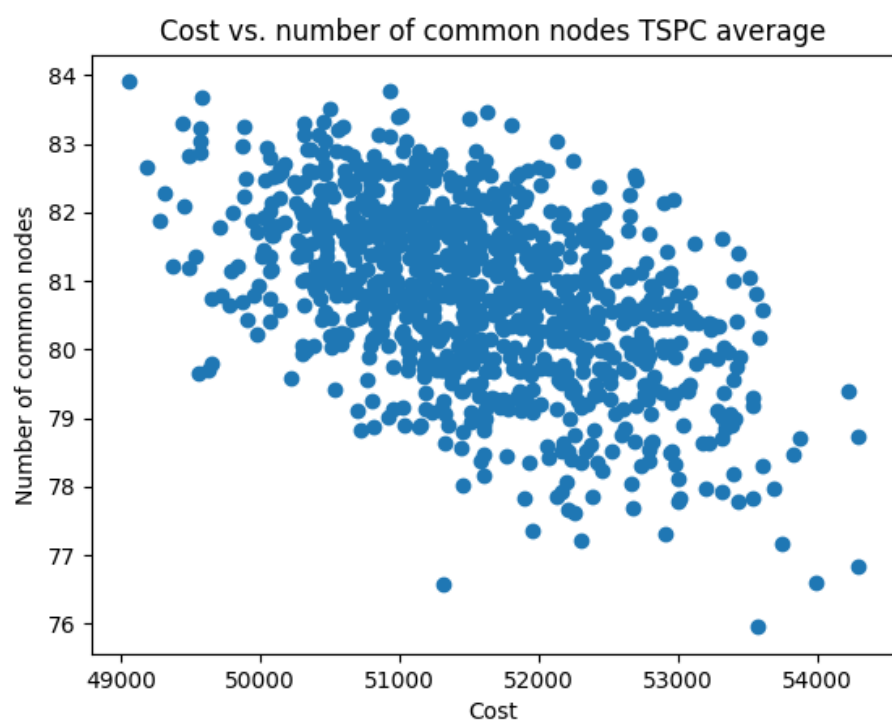


Figure 13: Average cost vs common nodes for TSPC

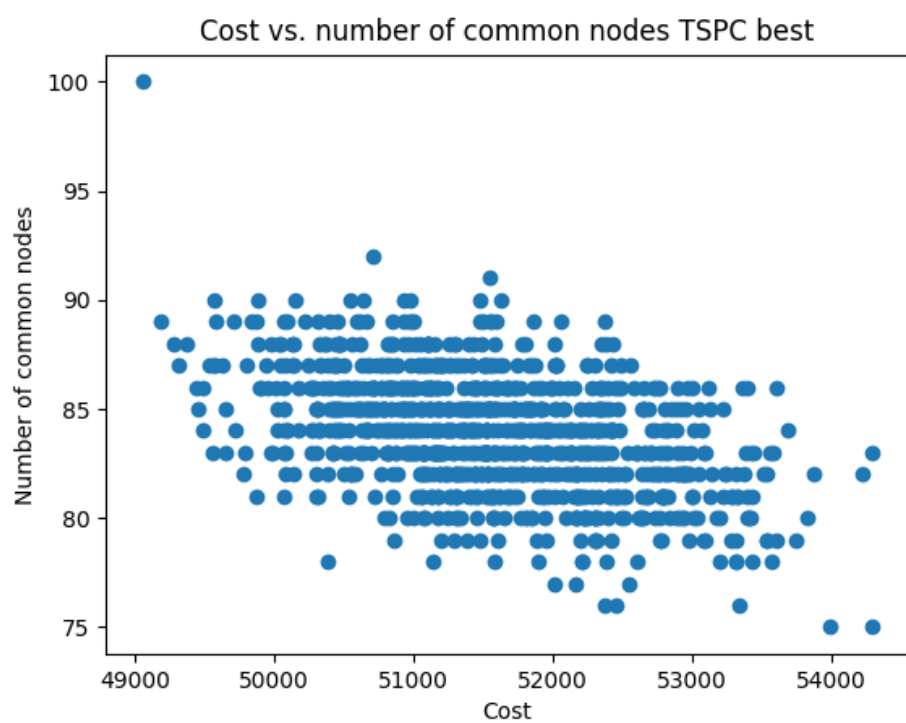


Figure 14: Best cost vs common nodes for TSPC

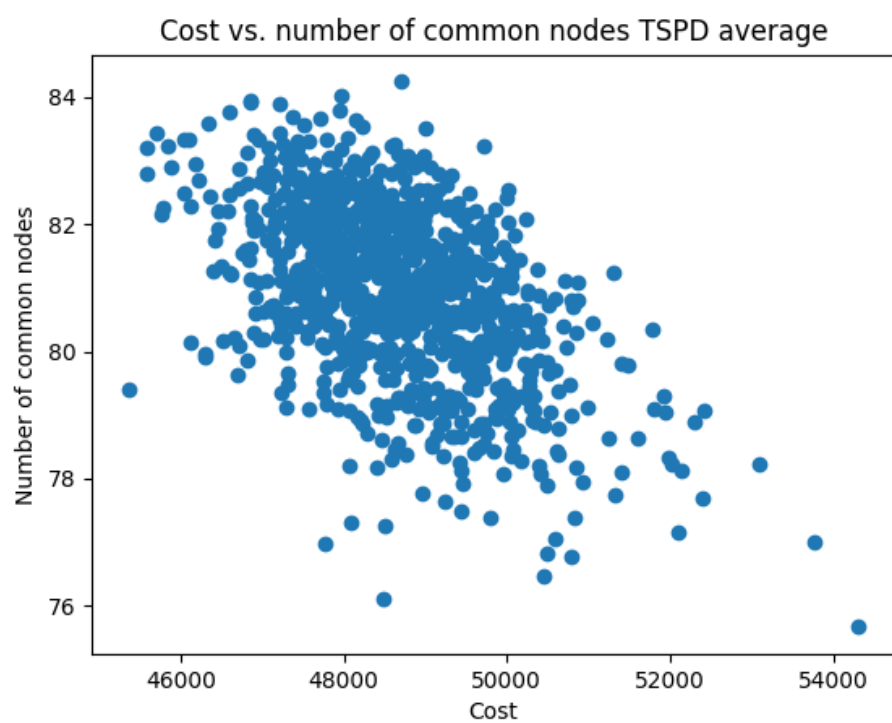


Figure 15: Average cost vs common nodes for TSPD

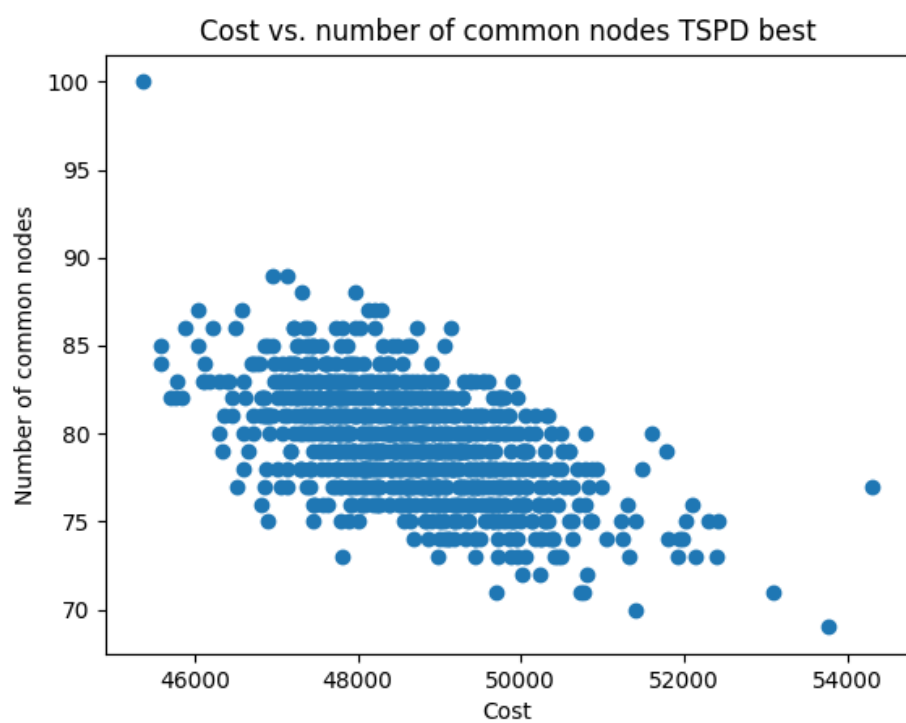


Figure 16: Best cost vs common nodes for TSPD