Evolutionary Computation - lab assignment 7

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Problem description

Global convexity (fitness-distance/similarity correlations) tests

For each instance generate 1000 random local optima obtained from random solutions using greedy local search. For each solution calculate its similarity either to the best solution (could the best out of the 1000 local optima or an even better solution generated by another method) or the average similarity to all other local optima. Make charts, x-axis – value of the objective function, y-axis (average) similarity. In the results with similarity to the best solution do not include the best solution (it would be an outlier with 100% similarity to itself).

Use (separately) two measures of similarity:

- The number of common edges.
- The number of common selected nodes.

Finally we have 8 charts: 2 instances, 2 versions of similarity (either to the best or average), 2 similarity measures (either common edges or common selected nodes).

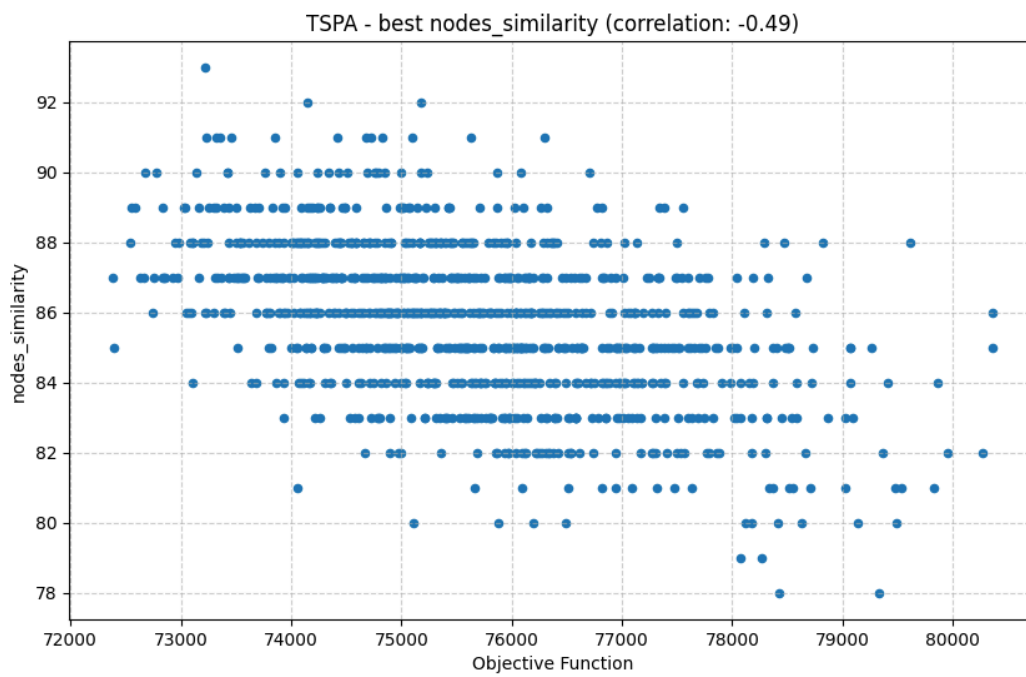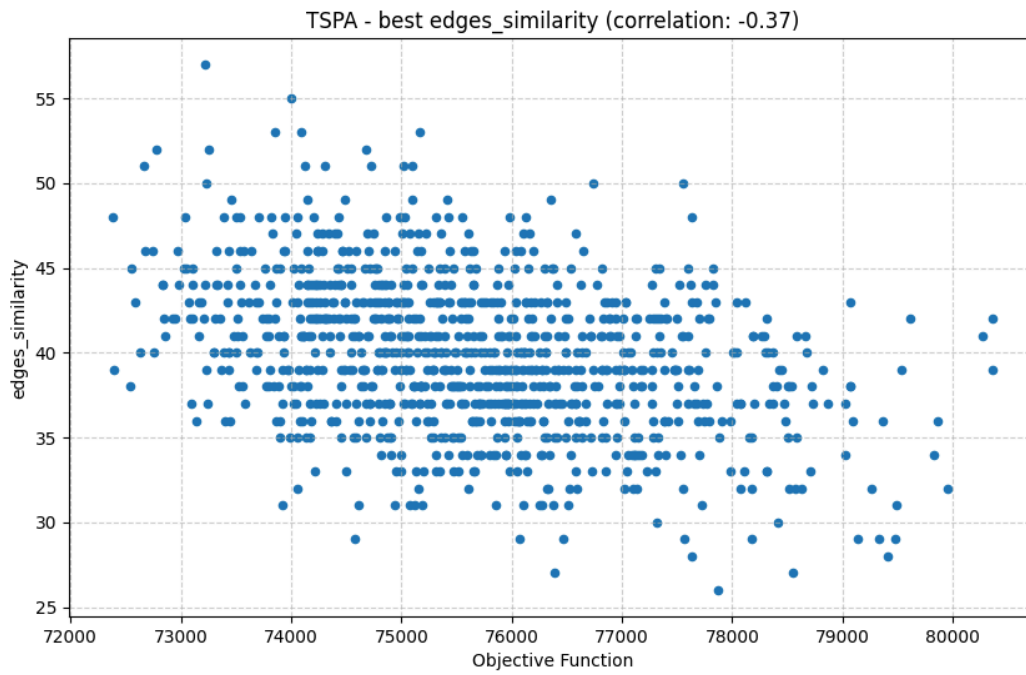For each chart calculate also the correlation coefficient
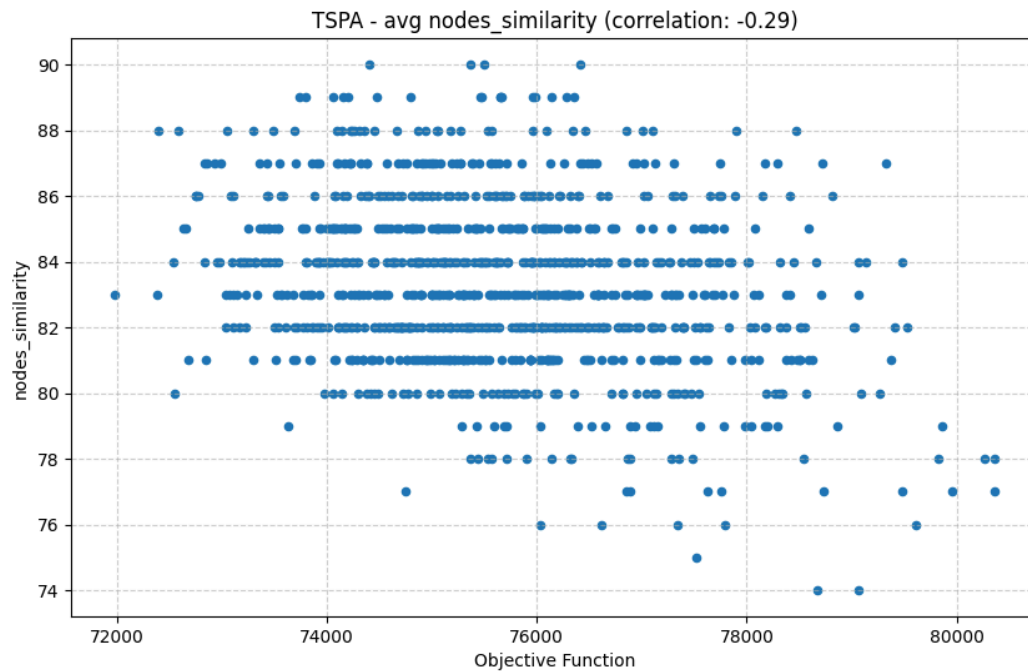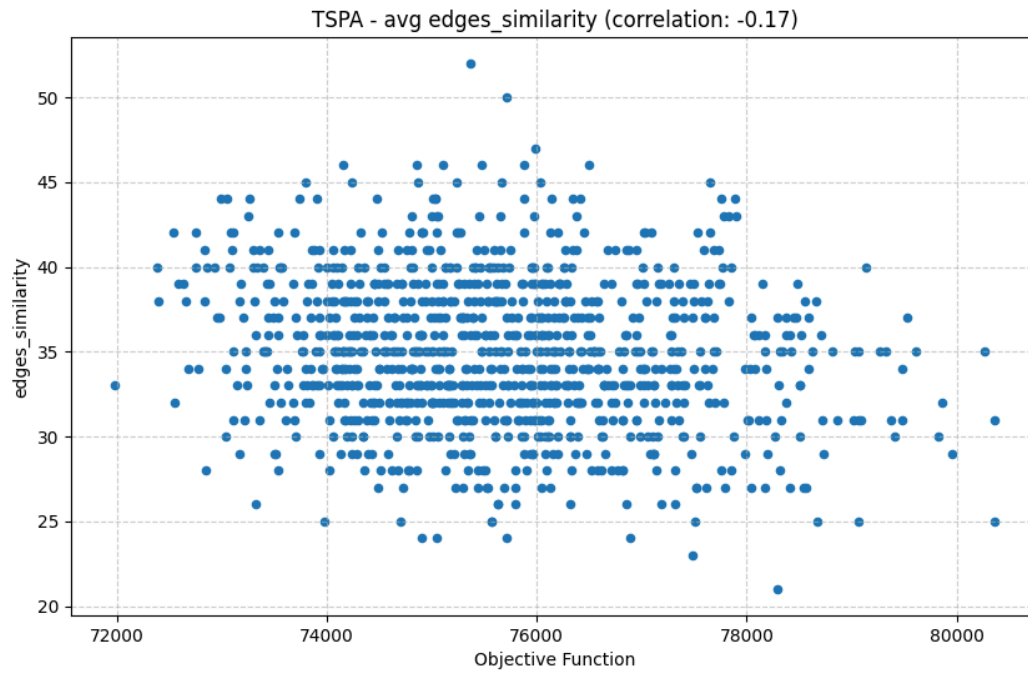
Results

Notes

- Comparison to best and avg of the 1000 runs (no separate method used)
- "Average solution" is determined by:
    - Calculating the average value of all solution's objective functions
    - Choosing the solution with the smallest absolute value of the difference between its objective function and the average
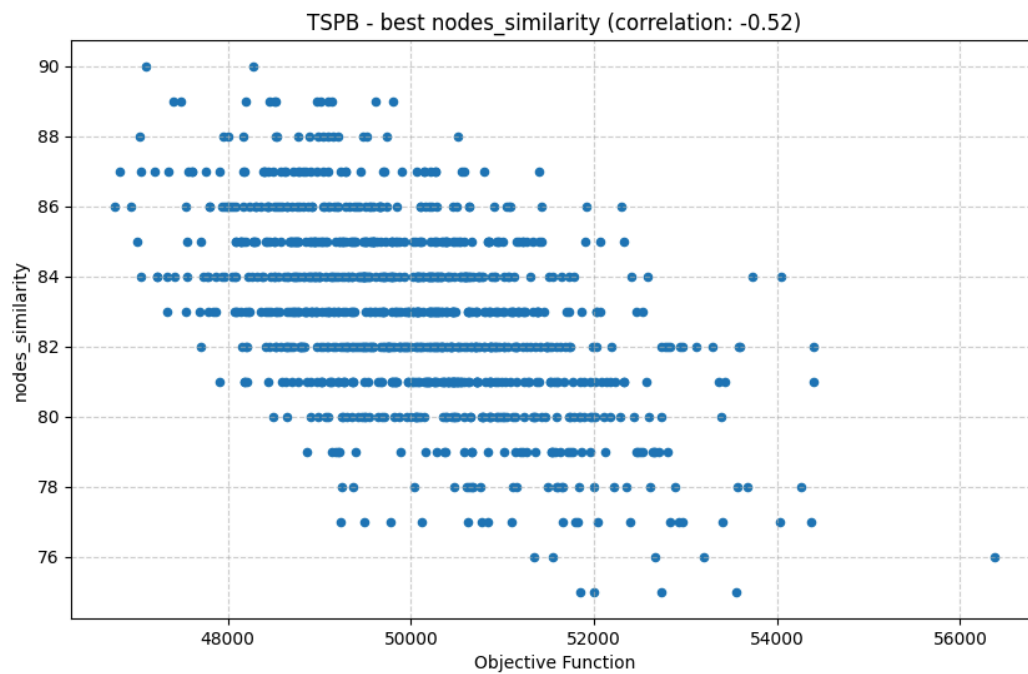
Charts

TSPA - compared to best solution

TSPA - best edges_similarity (correlation: -0.37)

TSPA - best nodes_similarity (correlation: -0.49)

TSPA - compared to average solution

TSPA - avg edges_similarity (correlation: -0.17)

TSPA - avg nodes_similarity (correlation: -0.29)

TSPB - compared to best solution

TSPB - best edges_similarity (correlation: -0.46)

TSPB - best nodes_similarity (correlation: -0.52)

TSPB - compared to average solution

TSPB - avg edges_similarity (correlation: -0.34)

TSPB - avg nodes_similarity (correlation: -0.40)