

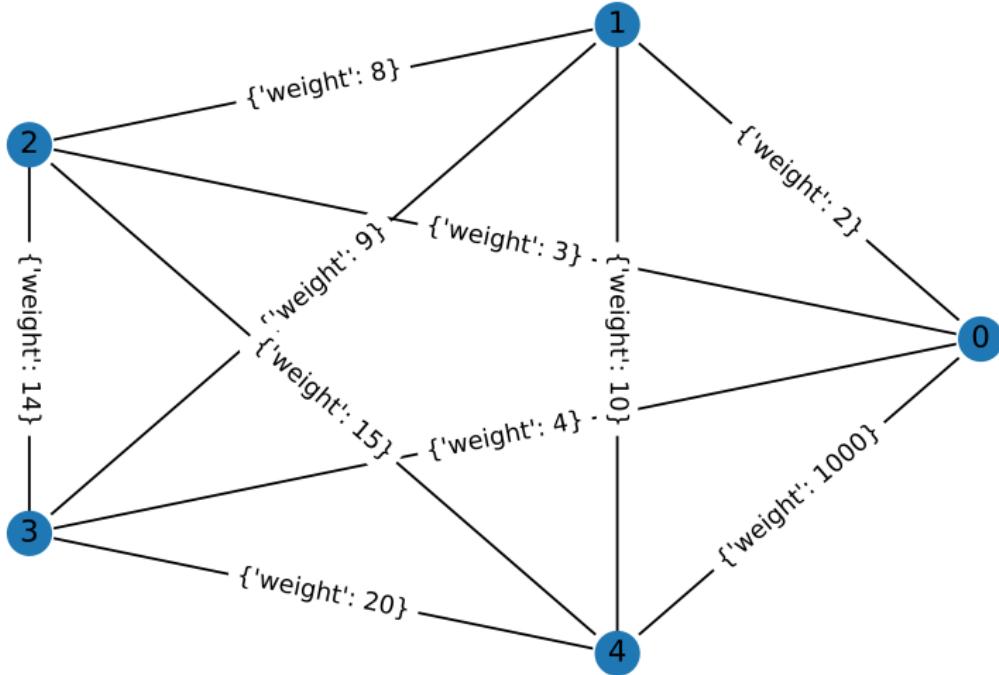
# Reševanje problema trgovskega potnika s k-optimalnim in Lin-Kernighanovim algoritmom

Žan Jernejčič in Ines Šilc

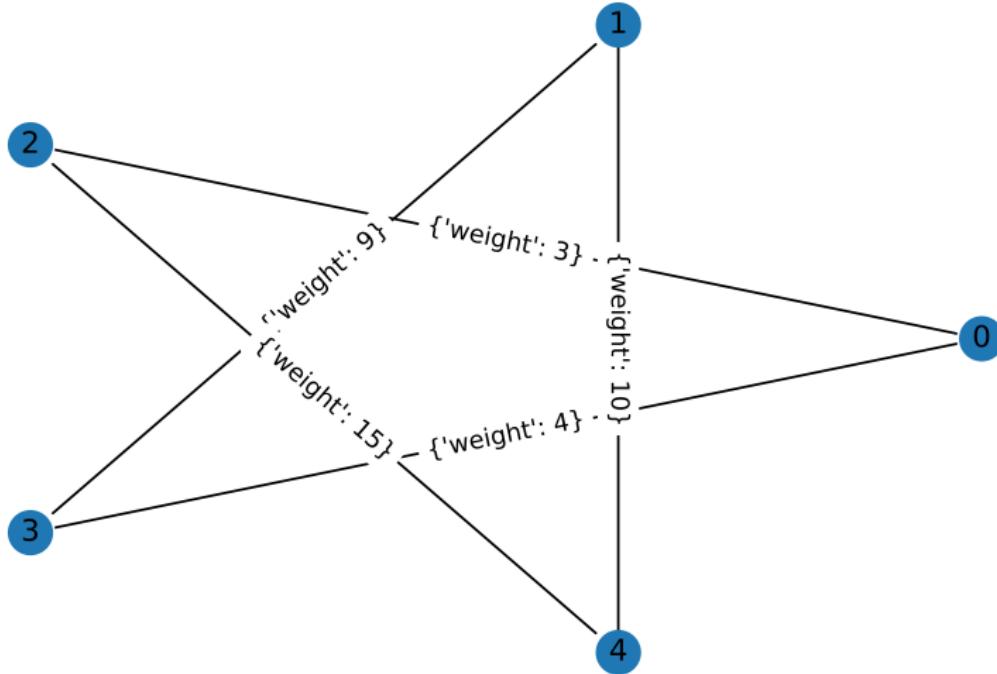
Fakulteta za matematiko in fiziko

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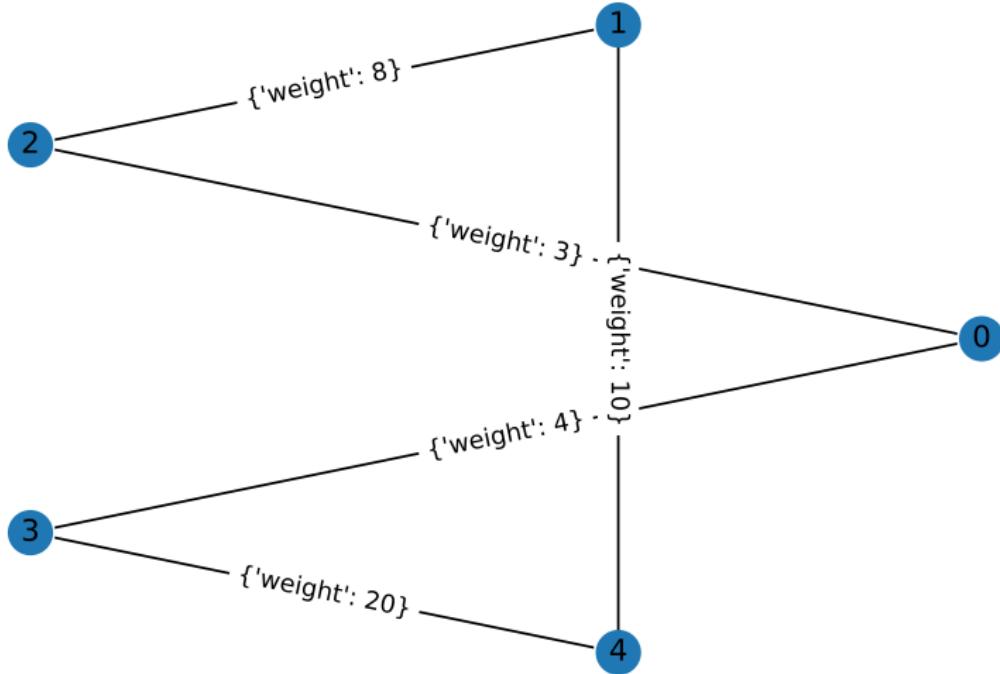
$$\begin{bmatrix} 0 & 2 & 3 & 4 & 1000 \\ 2 & 0 & 8 & 9 & 10 \\ 3 & 8 & 0 & 14 & 15 \\ 4 & 9 & 14 & 0 & 20 \\ 1000 & 10 & 15 & 20 & 0 \end{bmatrix} \quad (1)$$



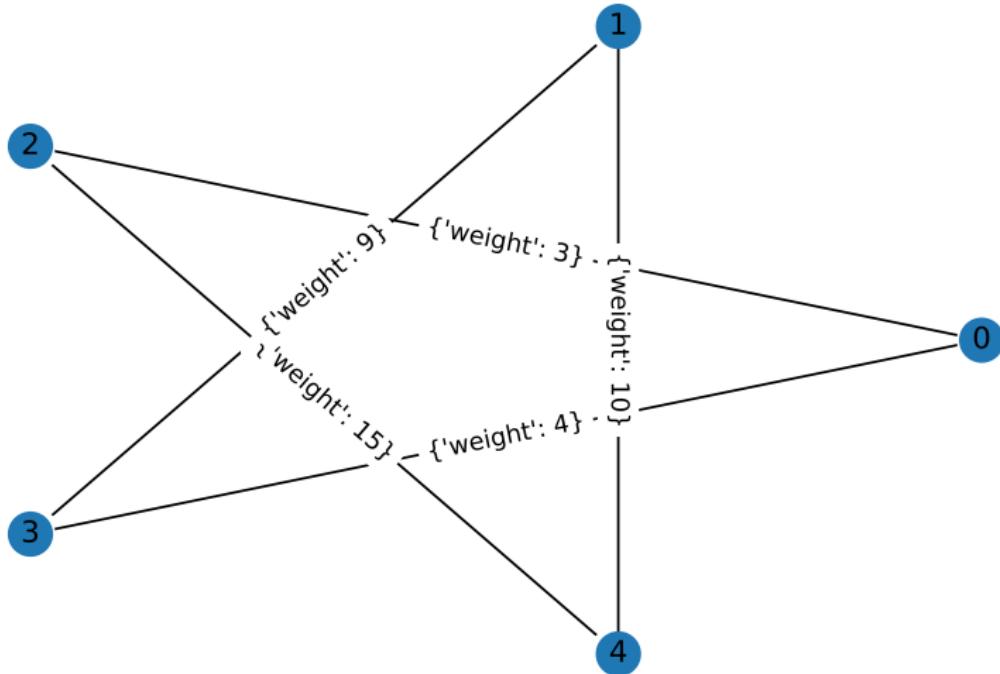
Slika 1: Poln graf na 5 vozliščih



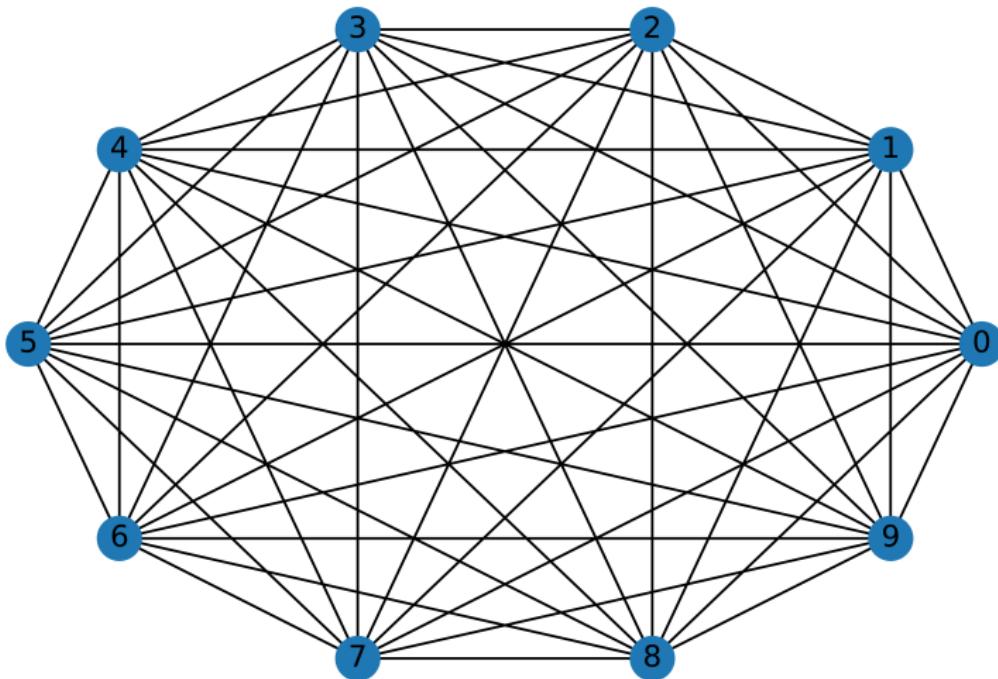
Slika 2: 2-opt



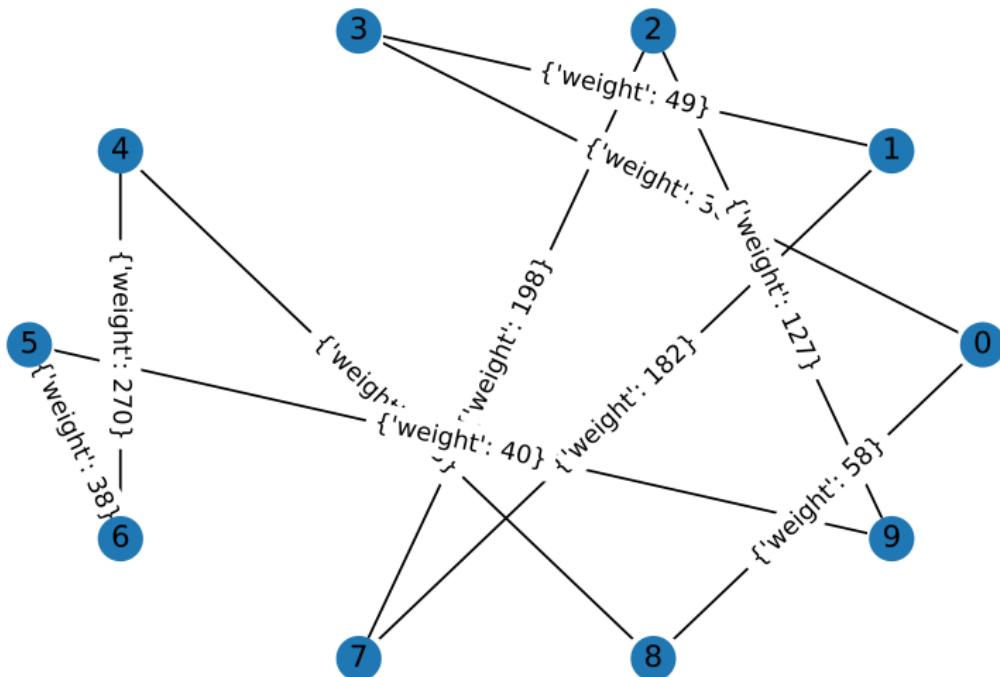
Slika 3: 3-opt



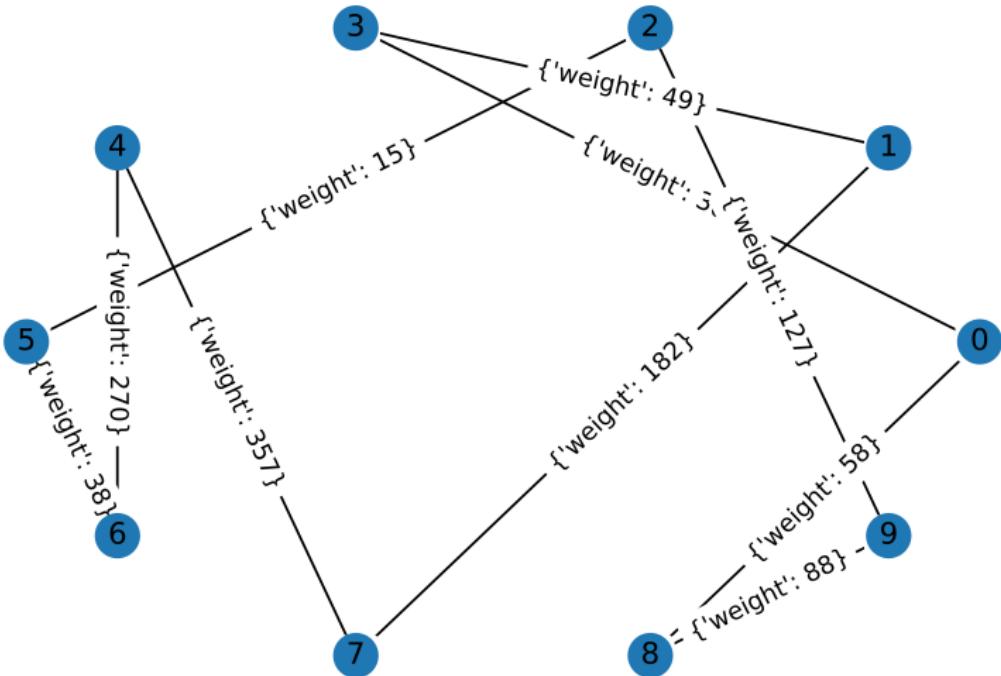
Slika 4: LK



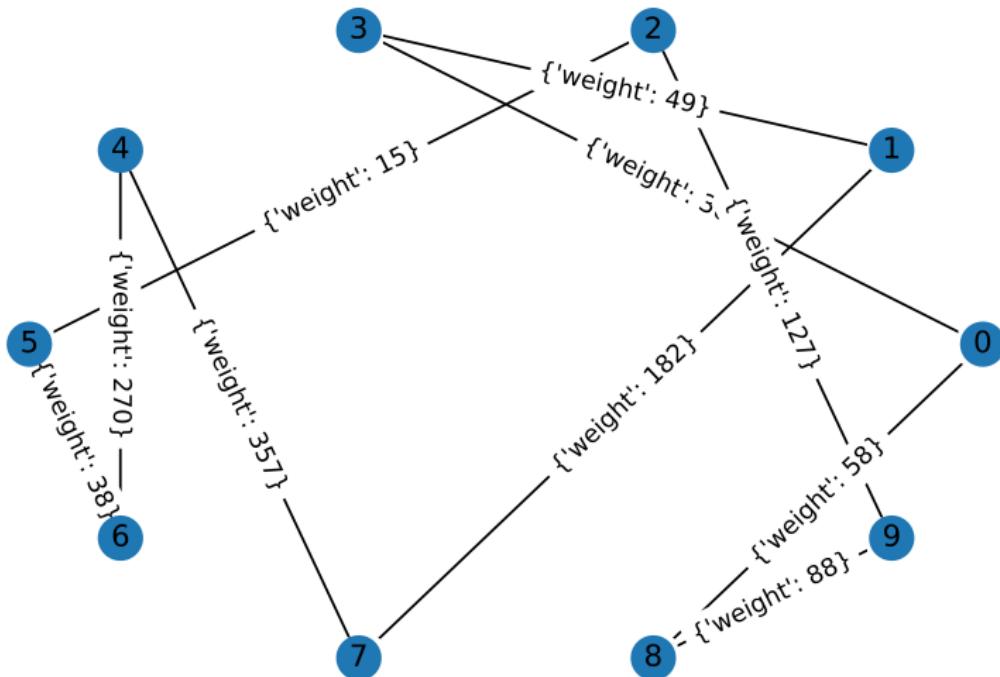
Slika 5: Poln graf na 5 vozliščih



Slika 6: 2-opt



Slika 7: 3-opt

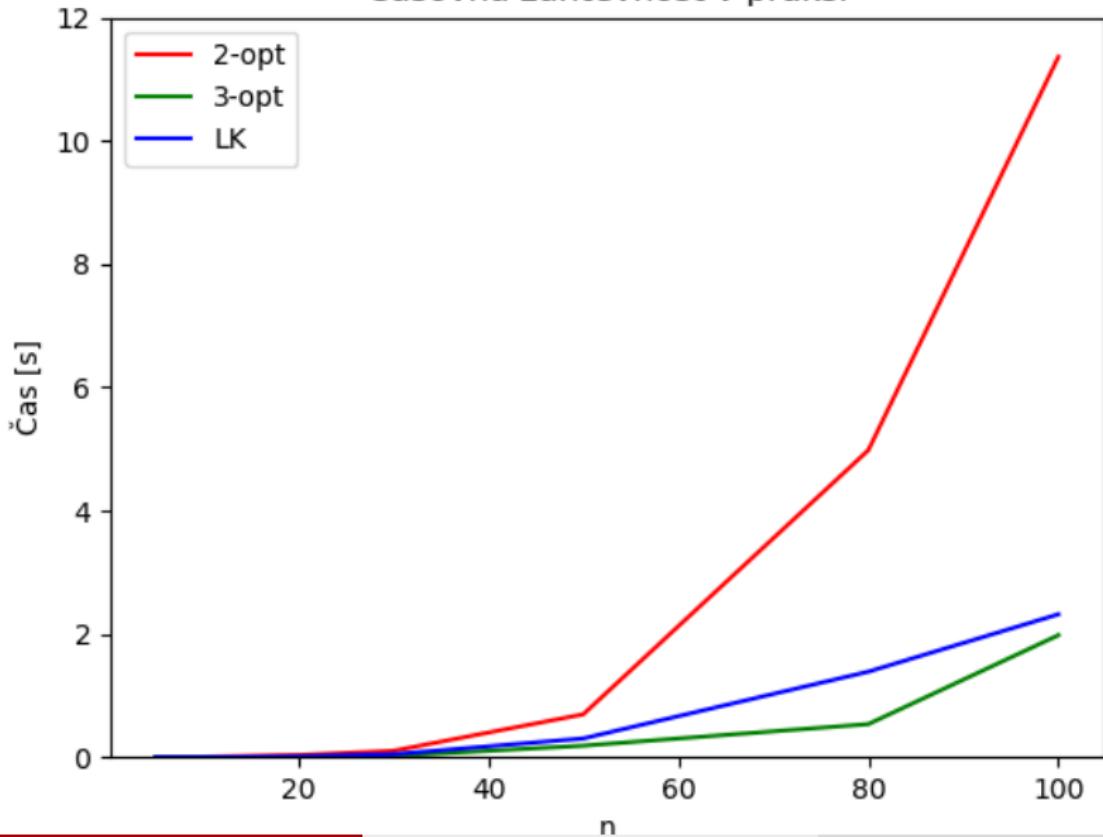


Slika 8: LK

$n$	začetek	2-Opt	cena 2-Opt	3-Opt	cena 3-Opt	LK	cena LK
5	49	0,000675	41	0,000276	41	0,000154	41
10	4903	0,004748	1595	0,000600	1484	0,000611	1484
20	9047	0,03257	1388	0,00801	1555	0,01151	1517
30	11825	0,10143	2255	0,01806	1907	0,04639	1729
50	23556	0,69378	2833	0,18529	2496	0,30218	2319
80	37169	4,97926	3352	0,53484	2890	1,38603	2362
100	46984	9,4767	3404	1,97813	2446	2,31723	2235
200	98344	194,093	4673	22,9016	3007	13,7700	2832
300	156543	1127,92	5365	162,040	2986	94,0348	2630
500	244733	7912,40	6689	402,52	3328	496,36	2900

Tabela 1: Tabela časov izvajanja algoritmov in cen v odvisnosti od  $n$

## Časovna zahtevnost v praksi



- ① A. Hagberg, D. Schult, P. Swart: *NetworkX Reference, Release 2.4*, [ogled 2. 1. 2020], dostopno na [https://networkx.github.io/documentation/stable/\\_downloads/networkx\\_reference.pdf](https://networkx.github.io/documentation/stable/_downloads/networkx_reference.pdf)
- ② *Optimization with 2-OPT - Part 1*, [ogled 3. 1. 2020], dostopno na <http://pedrohfds.com/2017/08/09/2opt-part1.html>
- ③ *2-opt*, [ogled 3. 1. 2020], dostopno na <https://en.wikipedia.org/wiki/2-opt>
- ④ *3-opt*, [ogled 4. 1. 2020], dostopno na <https://en.wikipedia.org/wiki/3-opt>
- ⑤ *3-opt: basic algorithm*, [ogled 4. 1. 2020], dostopno na <https://tsp-basics.blogspot.com/2017/03/3-opt-iterative-basic-algorithm.html>
- ⑥ D. Karapetyan, G. Gutin, *Lin-Kernighan Heuristic Adaptations for the Generalized Traveling Salesman Problem*, [ogled 8. 1. 2020], dostopno na <https://arxiv.org/pdf/1003.5330.pdf>