

Implementation

Details

- Library functions have been used whenever possible.
- A new custom class has been defined in order to deal with the custom weight function used in Algorithm WD. This new class inherits from `tuple` and implements addition and comparison as described in the paper.
- Time complexity has been assessed with the library `big_o` (https://github.com/pberkes/big_O), which just measures the running time for different values of n and then fits a set of different time complexity classes, in order to find the best one.
- Space complexity has been assessed analytically, due the absence of a Python library able to perform an empirical analysis.

Implementation

Time complexity assessment

- Algorithm CP [$O(E)$]
Linear: $\text{time} = 0.00033 + 1.2E-05 * n$
- Algorithm WD [$O(V^3)$]
Cubic: $\text{time} = 0.039 + 3.8E-07 * n^3$
- Algorithm OPT1 [$O(V^3 \lg V)$]
Cubic: $\text{time} = 0.066 + 4.7E-07 * n^3$
- Algorithm FEAS [$O(VE)$]
NODES: Quadratic: $\text{time} = 0.014 + 2.8E-05 * n^2$
EDGES: Quadratic: $\text{time} = 0.0051 + 1.5E-05 * n^2$
- Algorithm OPT2 [$O(VE \lg V)$]
Polynomial: $\text{time} = -9.3 * x^{2.2}$