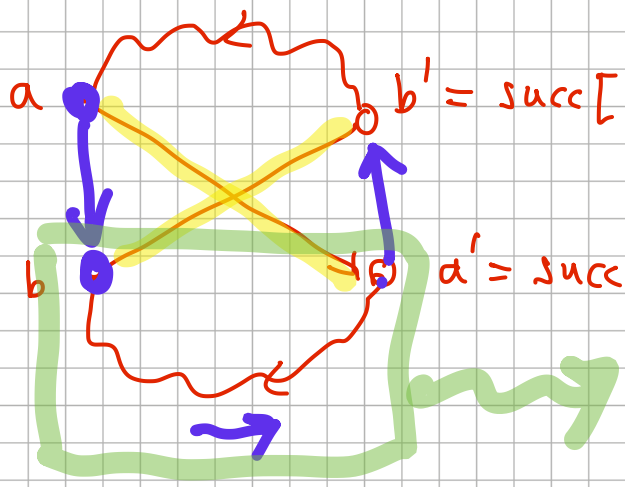
OR2 16-MAR-2017

REFINEMENT ALG.

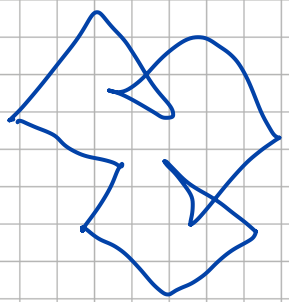
2-OPT MOVE



$\Delta cost(a,b)$ = new - old cost =

$$\underbrace{\left(c[a,b] + c[a',b']\right)}_{\text{new}} - \underbrace{\left(c[a,a'] + c[b,b']\right)}_{\text{old}}$$

$< 0 \Rightarrow$ improve current sol. by implementing the 2-OPT move



current TSP

→ TRY all (a,b) pairs

$\Delta cost(a^*,b^*)$ is a minimum

→ $\Delta cost(a^*,b^*) < 0$

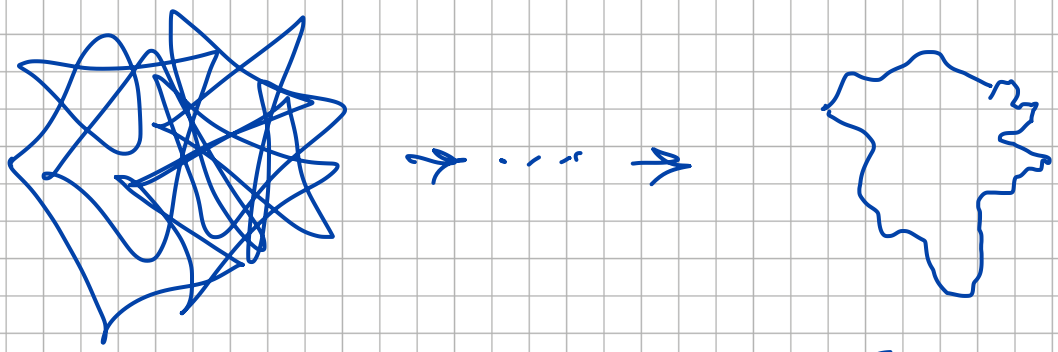
$\Rightarrow$ implement & repeat

$$\frac{n \cdot (n-1)}{2}$$

options

$\sim O(n^2)$

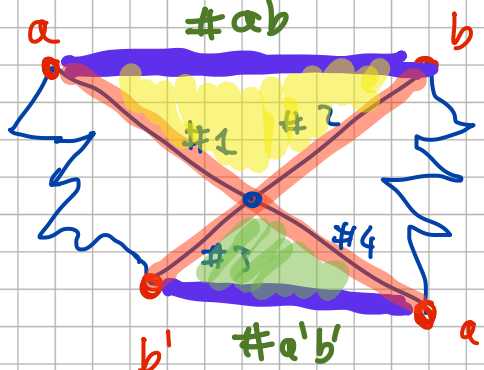
$\Delta cost(a,b)$ takes $O(1)$ time (constant)



RANDOM MULTI-START + (2-OPT)

(GREEDY + GRASP) → 2-OPT

(EXTRA-MILEAGE + GRASP) → 2-OPT



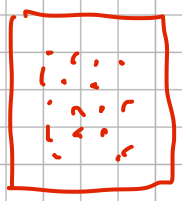
EUCLIDEAN-DISTANCES

$\Delta cost(a,b) < 0$

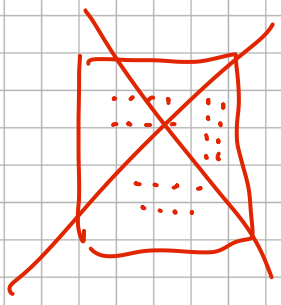
HOW TO COMPARE ~~OPT.~~ HEUR. ALG.S ?

- FIX A TIME-LIMIT (5-MINUTES ?)
- TEST BED " training / validation set in ML "

~100 instances



random in the 1000x1000 square



- COMPARISON AMONG HEURISTICS

~~TIME LIMIT FIXED~~

QUALITY OF THE SOL → COST

" the lower the better "

EX 3 COMPETING ALG.S

~ 1 ~ 2 ~ 3

NAIVE COMPARISON: AVERAGE COST → MINIMUM !

GEO. MEAN COST → MINIMUM!

$$\frac{\sum_{k=1}^{n} v_k}{n}$$

AR. MEAN (AVERAGE)

$$\left(\prod_{k=1}^{n} v_k\right)^{1/n}$$

GEO. MEAN

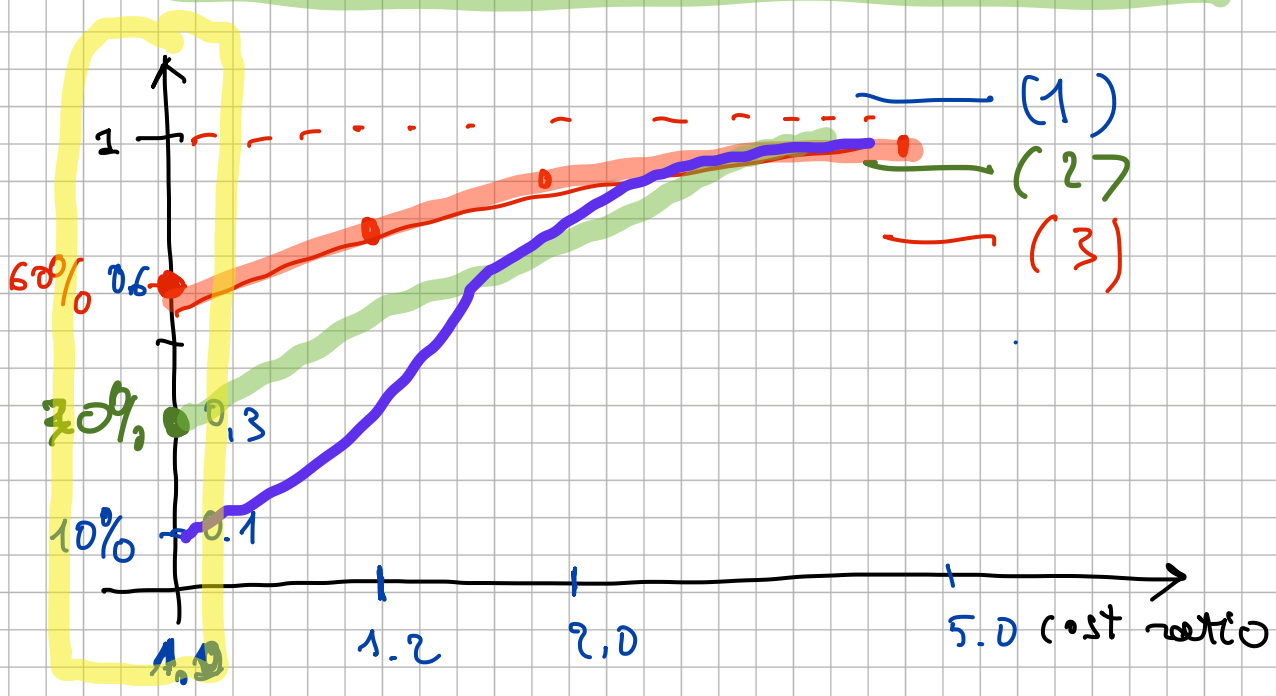
$$\log\left(\prod_{k=1}^{n} v_k\right)^{1/n} = \frac{1}{n}\sum_{k=1}^{n}\log(v_k)$$

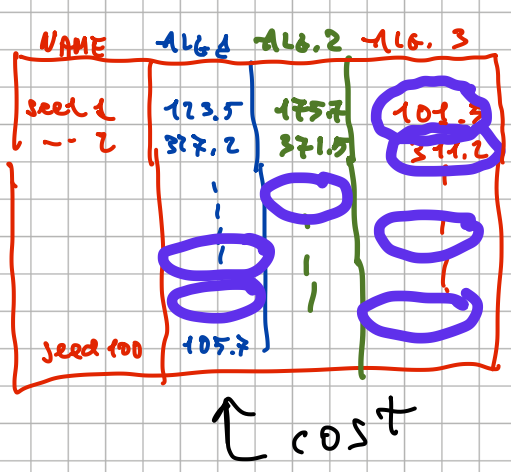
average of the log.s

e e

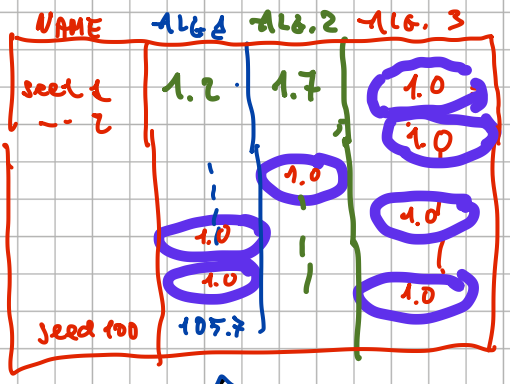
STATE-OF-THE-ART

PERFORMANCE PROFILE PLOTS

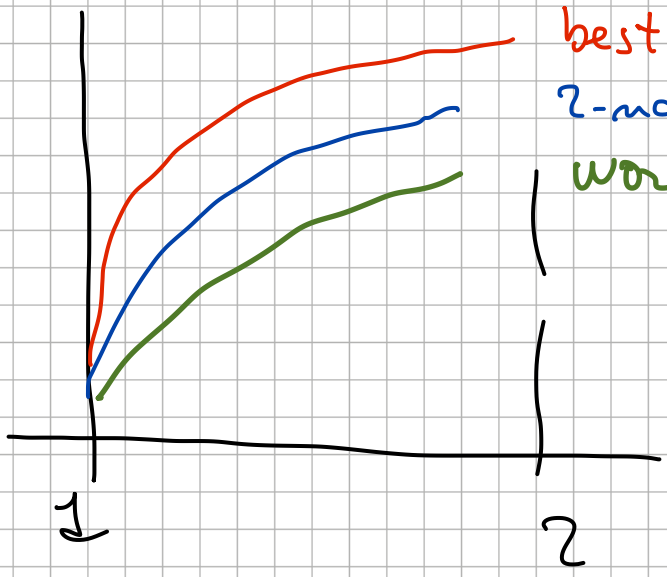


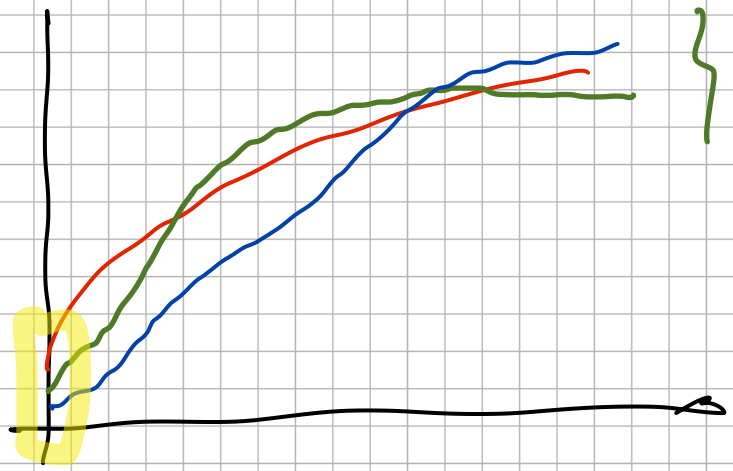


cost



RATIOS WRT BEST





} no clear winner