# Config

Birds=200

moveRandom = 0.1589684022681154

moveBest = 0.4624556400235943

moveJoin = 0.33611898159023834

smallBirdRatio = 0.6979749881176104

maxIters = 4\_000\_000

# Benchmark

Combined Results:

Avg. Distance: 1 822 014

Avg. Time: 15,0759 seconds

Median Distance: 608721

Median Time: 7,105 seconds

Median abs Error: 433 352.5

Mean abs Error: 1 520 067

Median rel Error: 198,95%

Mean rel Error: 349,38%

# Swap cities for local search

Avg. Distance: 3802648

Avg. Time: 6,3799 seconds

Median Distance: 1452161

Median Time: 2,712 seconds

2-opt local search without density estimation:

Avg. distance: 2802130

Avg. time 7,5544

TopN (0.25)

Combined Results:

Avg. Distance: 1 195 492

Avg. Time: 15,368 seconds

Median Distance: 392 208

Median Time: 7,4291 seconds

Median abs Error: 216 839.5

Mean abs Error: 893 544

Median rel Error: 95,65%

Mean rel Error: 218,19%

TopN (0.20)

Combined Results:

Avg. Distance: 1 094 916

Avg. Time: 15,2137 seconds

Median Distance: 369 203

Median Time: 7,4545 seconds

Median abs Error: 193 834.0

Mean abs Error: 792 969

Median rel Error: 84,96%

Mean rel Error: 198,02%

TopN (0.15)

Combined Results:

Avg. Distance: 992 959

Avg. Time: 15,6552 seconds

Median Distance: 327 205

Median Time: 7,668 seconds

Median abs Error: 151 836.5

Mean abs Error: 691 011

Median rel Error: 69,54%

Mean rel Error: 174,55%

TopN (0.05)

Combined Results:

Avg. Distance: 693 154

Avg. Time: 15,1584 seconds

Median Distance: 243 016

Median Time: 7,7915 seconds

Median abs Error: 67 647.0

Mean abs Error: 391 207

Median rel Error: 32,27%

Mean rel Error: 104,47%

TopN (0.01)

Combined Results:

Avg. Distance: 536 800

Avg. Time: 15,0896 seconds

Median Distance: 212 960

Median Time: 7,4011 seconds

Median abs Error: 37 591.5

Mean abs Error: 234 852

Median rel Error: 18,54%

Mean rel Error: 60,27%

TopN (0.01) + Opt 2 plain

Combined Results:

Avg. Distance: 588124

Avg. Time: 13,952 seconds

Median Distance: 224965

Median Time: 6,5145 seconds

Median abs Error: 49596.0

Mean abs Error: 286176

Median rel Error: 24,71%

Mean rel Error: 65,03%

TopN (0.01) + Fast density

Combined Results:

Avg. Distance: 536 549

Avg. Time: 15,3477 seconds

Median Distance: 209 806

Median Time: 7,5805 seconds

Median abs Error: 34 437.0

Mean abs Error: 234 601

Median rel Error: 16,53%

Mean rel Error: 59,71%

TopN (0.01) + Faster density

Combined Results:

Avg. Distance: 532048

Avg. Time: 15,1638 seconds

Median Distance: 209128

Median Time: 7,5025 seconds

Median abs Error: 33759.5

Mean abs Error: 230101

Median rel Error: 16,67%

Mean rel Error: 60,03%

TopN (0.01) + Opt 3

Combined Results:

Avg. Distance: 473110

Avg. Time: 148,0017 seconds

Median Distance: 206024

Median Time: 43,5085 seconds

Median abs Error: 30655.0

Mean abs Error: 171162

Median rel Error: 15,13%

Mean rel Error: 40,49%

TopN (0.01) + NN init

Combined Results:

Avg. Distance: 317163

Avg. Time: 18,1431 seconds

Median Distance: 187163

Median Time: 9,3431 seconds

Median abs Error: 11794.5

Mean abs Error: 15216

Median rel Error: 5,43%

Mean rel Error: -1,61%