# Config

Birds=200

moveRandom = 0.1589684022681154

moveBest = 0.4624556400235943

moveJoin = 0.33611898159023834

smallBirdRatio = 0.6979749881176104

maxIters = 4\_000\_000

# Benchmark

Combined Results:

Avg. Distance: 2 110 306

Avg. Time: 16,7091 seconds

Median Distance: 160 928

Median Time: 7,9236 seconds

Median abs Error: 121 841.0

Mean abs Error: 1 781 591

Median rel Error: 214,92%

Mean rel Error: 416,47%

# 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: 1396246

Avg. Time: 27,2108 seconds

Median Distance: 108732

Median Time: 8,6325 seconds

Median abs Error: 69645.0

Mean abs Error: 1067530

Median rel Error: 122,65%

Mean rel Error: 268,96%

TopN (0.20)

5x:

Combined Results:

Avg. Distance: 1294007

Avg. Time: 34,9656 seconds

Median Distance: 68702

Median Time: 1,963 seconds

Median abs Error: 5066.0

Mean abs Error: 965292

Median rel Error: 6,06%

Mean rel Error: 245,54%

Combined Results:

Avg. Distance: 1268508

Avg. Time: 17,0838 seconds

Median Distance: 68227

Median Time: 2,0131 seconds

Median abs Error: 4591.0

Mean abs Error: 939793

Median rel Error: 5,77%

Mean rel Error: 250,13%

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: 1181836

Avg. Time: 29,2497 seconds

Median Distance: 68499

Median Time: 1,9951 seconds

Median abs Error: 4862.5

Mean abs Error: 853121

Median rel Error: 6,14%

Mean rel Error: 220,14%

Combined Results:

Avg. Distance: 1148158

Avg. Time: 18,6461 seconds

Median Distance: 65814

Median Time: 2,038 seconds

Median abs Error: 2178.0

Mean abs Error: 819443

Median rel Error: 4,1%

Mean rel Error: 215,16%

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: 795942

Avg. Time: 93,8791 seconds

Median Distance: 68793

Median Time: 1,9545 seconds

Median abs Error: 5156.5

Mean abs Error: 467227

Median rel Error: 6,61%

Mean rel Error: 135,21%

Combined Results:

Avg. Distance: 818219

Avg. Time: 38,3008 seconds

Median Distance: 70399

Median Time: 1,9956 seconds

Median abs Error: 6762.5

Mean abs Error: 489504

Median rel Error: 7,88%

Mean rel Error: 136,71%

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: 612753

Avg. Time: 60,7589 seconds

Median Distance: 68356

Median Time: 1,9975 seconds

Median abs Error: 4720.0

Mean abs Error: 284038

Median rel Error: 5,55%

Mean rel Error: 84,3%

Combined Results:

Avg. Distance: 630992

Avg. Time: 17,1347 seconds

Median Distance: 68680

Median Time: 1,9956 seconds

Median abs Error: 5044.0

Mean abs Error: 302277

Median rel Error: 6,04%

Mean rel Error: 84,23%

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) + Plain Opt-2

Combined Results:

Avg. Distance: 575915

Avg. Time: 13,6169 seconds

Median Distance: 234065

Median Time: 6,2656 seconds

Median abs Error: 58696.5

Mean abs Error: 273967

Median rel Error: 28,02%

Mean rel Error: 65,37%

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) + Opt 3 only small birds

Combined Results:

Avg. Distance: 588070

Avg. Time: 55,005 seconds

Median Distance: 215366

Median Time: 30,0835 seconds

Median abs Error: 39997.5

Mean abs Error: 286123

Median rel Error: 19,42%

Mean rel Error: 63,69%

TopN (0.01) + Opt 3 only big birds

Combined Results:

Avg. Distance: 457211

Avg. Time: 36,5969 seconds

Median Distance: 197864

Median Time: 156,9376 seconds

Median abs Error: 22495.0

Mean abs Error: 155264

Median rel Error: 12,23%

Mean rel Error: 34,94%

No geo:

Combined Results:

Avg. Distance: 492444

Avg. Time: 89,9044 seconds

Median Distance: 69043

Median Time: 3,9011 seconds

Median abs Error: 5406.5

Mean abs Error: 163729

Median rel Error: 7,04%

Mean rel Error: 52,1%

TopN (0.01) + Opt 3 only big birds, big birds can’t fly

Combined Results:

Avg. Distance: 513140

Avg. Time: 66,8296 seconds

Median Distance: 68937

Median Time: 3,9481 seconds

Median abs Error: 5300.5

Mean abs Error: 184425

Median rel Error: 6,25%

Mean rel Error: 52,38%