# Benchmark

Birds=200

moveRandom = 0.1589684022681154

moveBest = 0.4624556400235943

moveJoin = 0.33611898159023834

smallBirdRatio = 0.6979749881176104

maxIters = 2\_000\_000

Avg. distance: 3444643

Avg. time 7,9197

# After bird joining fix

Avg. Distance: 2781422

Avg. Time: 7,6398 seconds

Median Distance: 928545

Median Time: 3,6961 seconds

# 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)

Avg. Distance: 3002017

Time: 7,7621 seconds

Distance: 993787

Time: 3,7281 seconds

Median Error: 818418.0

Mean abs Error: 2722354

TopN (0.20)

Avg. Distance: 2890884

Avg. Time: 7,6064 seconds

Median Distance: 1013999

Median Time: 3,7425 seconds

Median abs Error: 838630.5

Mean abs Error: 2588937