Assignment 6 Extra Credit

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Abstract: Using a Genetic Algorithm to find the Platonic solids

I. GENETIC ALGORITHM

Here a genetic algorithm is used to find the Platonic solids

There are four basic steps to a genetic algorithm:

1. Creating a gene pool

2. Encoding a configuration

3. Selection operation

4. Crossover operation

5. Mutation operation

I used most of the same code from the Thomson java file with a few key differences. For each point I found a list of the points closest to it with equal distance and made sure that the more that were equally distant it would reduce the energy cost. This pushes the algorithm to find shapes with regular polygons as faces.
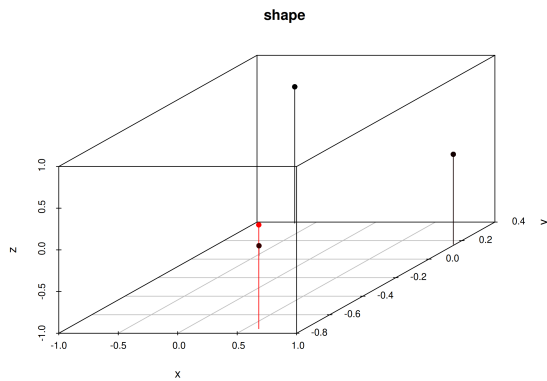
A. Tetrahedron
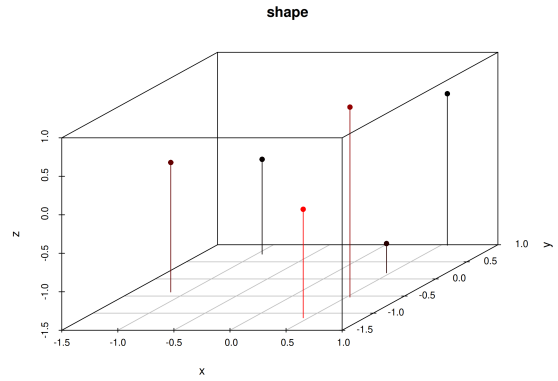

FIG. 1. Tetrahedron

B. Octahedron

FIG. 2. Octahedron
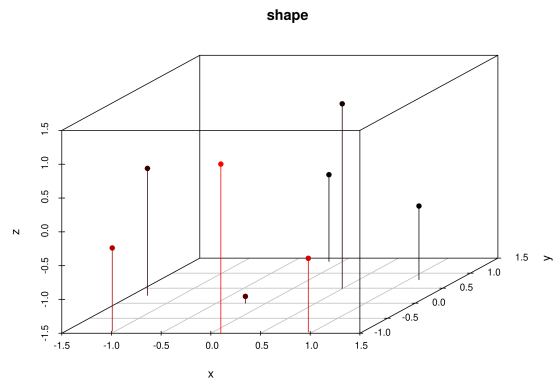
C. Cube

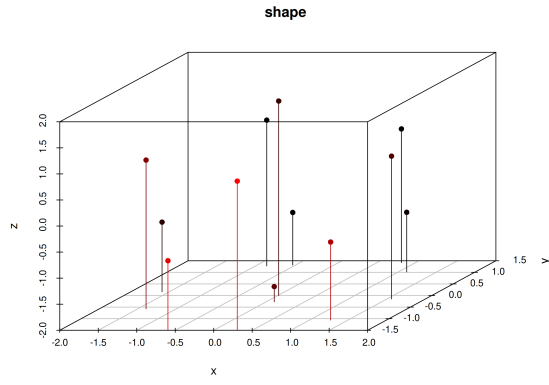FIG. 3. Cube

D. Icosahedron

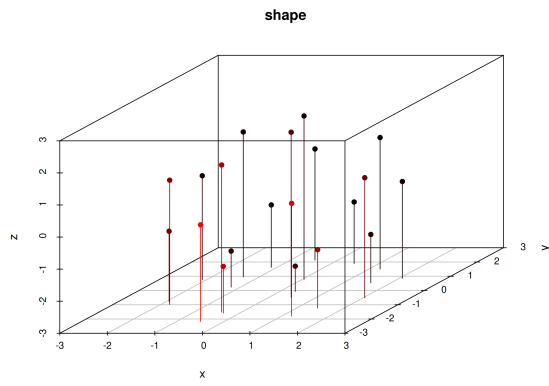

FIG. 4. Icosahedron

E. Dodecahedron

FIG. 5. Dodecahedron

[1] T. Pang, *Introduction to Computational Physics*, Cambridge University Press (2006).