

Project #1b - Genetic Algorithm

Evolutionary Computation

Spring 2014

Due Feb. 12th

This is the second subproject. The goal of this project is to write part of a genetic algorithm (GA) for one of the benchmark optimization problems.

For this subproject you only need to work on the Spherical function, defined at:

<http://www.cs.cmu.edu/afs/cs/project/jair/pub/volume24/ortizboyer05a-html/node6.html#tabla:DefFunc>.

(Note the first function labeled as Schwefel on this page is actually the double sum, which we are not using. We are using the Schwefel function defined immediately after the Rastigin function.)

Pay careful attention to the ranges of the functions. You will want to use those ranges both in creating initial individuals and in controlling the generation of neighbors, e.g. you don't want your GA 'wondering' out of the search space. Note that here the functions are all defined with 30 dimensions, e.g. $P = 30$ in the function definitions.

Project Requirements:

- Write a **partial** GA to find the input values (x_1, \dots, x_{30}) that minimizes the Spherical function.
- The GA should include the following:
 - Fitness function
 - Algorithm type: Steady state or generational
 - Selection
 - Mutation

Note: you don't need crossover for this part.

- **Project Write-up:** Write a short paper describing the results of your project that includes the following sections:
 - **Algorithm descriptions** - Description of the GA so far. Be careful to include all of the details someone would need to replicate your work.
 - **Results** - Basically, does it seem to be working.
 - **Conclusions** - If its not working, why not. And what are then next steps to complete the project.