

Project #1a - Hill Climbing and Simulated Annealing

Evolutionary Computation Spring 2014 Due Feb. 5th

This is the first subproject of the first project. The goal of this project is to write and test a hillclimbing and simulated annealing search algorithms for two of the benchmark optimization problems.

For this subproject you only need to work on the Spherical and Schwefel functions, 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 hill climbing algorithm and a simulated annealing algorithm to find the input values (x_1, \dots, x_{30}) that minimizes the two test function.
- **Project Write-up:** Write a short paper describing the results of your project that includes the following sections:
 - **Algorithm descriptions** - Description of the two algorithms. Be careful to include all of the details someone would need to replicate your work: how neighbors are generated in hill climbing, what the temperature schedule is for simulated annealing, etc. .
 - **Results** - Table showing the results for both algorithms on both test functions.
 - **Conclusions** - If its not working, why not. And what are then next steps to complete the project.