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CS385 : Evolutionary Computing

Homework 5

1. Genetic Algorithm Lab:
   1. Explain the purpose of the **bounds** variable
      1. This variable is used to ensure that when mutations occur they still fall under some bounded range and aren’t completely out of scope of the solution we are searching for. Also when first initializing the bound vector is used.
   2. Explain how a candidate solution is represented
      1. Is represented in a vector of solutions containing crossovers and mutations.
   3. Explain the relationship between the **pop**, **fpop** and **cpop** vectors.
      1. Pop is a vector from 1 to n representing the solutions
      2. Fpop is a vector with the same number of values as pop but each pop value has be evaluated by the fitness function
      3. Cpop holds those solutions of fpop which would be suitable for breeding and mutations
   4. Explain how crossover is performed between two parents to produce offspring.
      1. Probability of a parent being chosen for reproduction is based on their fitness level. The higher the fitness value the higher the probability of that parent being chosen to produce offspring.
      2. This is shown by the r\*parent(i) + (1-r)\*parent(i+1) and the line following this line.
   5. Explain how mutation occurs. How often is mutation performed, and how can that be adjusted?
      1. A mutation occurs using the rand function and multiplying that by blength which is the bounds range. This gives a number from 1 to the bound range. Then this number is added to -10 and this will be added to
2. Modify the code to minimize a function of two variables:
   1. First the evaluation function would be changed to accept a vector x. The function would then use the formula with x = x(1) and y = x(2). The pop, fpop, and cpop would also have to change to accommodate for this change. Currently these vectors are holding scalar values. For two variable minimizing functions they would need to be 2-dim vectors.