

EquationSolver

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1 Design and Approach

In my approach to the Genetic Algorithm I followed the structure from the [BriefIntroductionToGeneticAlgorithms.pdf](#).

I first make the population with random chromosomes. I then check all of my values to see if they are at the threshold as I generate them to see if I can return any right away.

I then select Chromosomes to reproduce together with either the Roulette selection or with a Tournament selection. Once I select the parents I see if I need to do a crossover or need to do a mutation based on the probability.

Once I have my next generation I repeat this process until either I get to my max generations or I have a fitness that exceeds the threshold.

2 Fitness Criterion

For my Criterion I used the equation that was given to us: $6x - x^2 + 4y - y^2$

3 Threshold

My threshold I used 13 as my threshold because whenever I was running through the most fit chromosomes that was the highest fitness I came across.

4 What “selection type” produced the best results

My tournament selection usually would produce the best results despite them being minimal.

5 How did your implementation perform mutation?

In order to see if I am going to mutate I compare our mutation probability times 100 to a random integer between 0-100 and if the probability is higher than I mutate. Once I mutate I change both x and y to random integers.

6 How did your implementation perform crossover?

In order to see if I am going to crossover I compare our crossover probability times 100 to a random integer between 0-100 and if the probability is higher than I crossover. I then have a crossover point, if its 0 I just take the dad's genes. If it is 1 I take one of each. If it is 2 I just take the mother's genes.