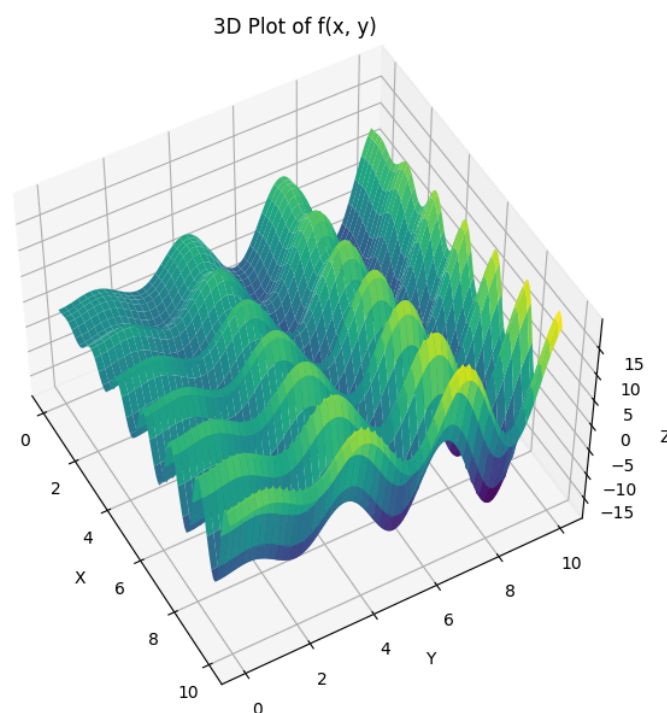# Lab 2

Grupp: Peter Niklasson (pi3), Maximilian Karlsson (pi3)

Q1: Why are there two curves in the plot? What does the jagged curve represent?

The first curve shows the mean value of the fitness for the population genes over generations and the other curve shows the top fitness and in which generation it converges to its maximum for the top 10 individuals.

Q2:

3D Plot of f(x, y)

Q3: Describe the main changes you did to the code.

- We changed from discrete to continuous case of the genes, i.e set the gene attribute to be a list of two constants in the range 0-10
- We implemented the linear blending (from the lectures) in the reproduce function and created 3 childs instead of two. We then discarded one of the children randomly and let the other two reproduce.
- We implemented a mutation following the instructions.

Q4: What is the minimum, and what are the x and y values at this point?

x = 9.04, y = 8.67, fmin = -18.56

Q5: How many generations does your GA require to solve the problem? Give the average of ten runs.

Average generations to solve: 23.6 times

Q6: What happens if the mutation size (the parameter a above) is set to a low value?
It doesnt find the global minimum in the region of 0<x,y<10 but instead finds a local one. It gets stuck in a local minima. I.e the fitness is getting stuck which can be seen in the graph below.
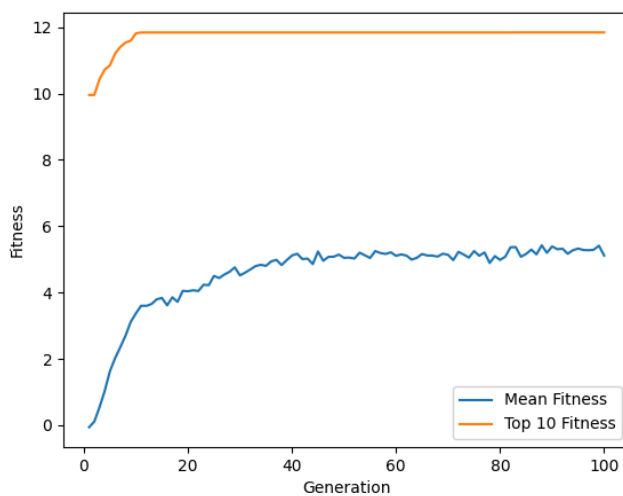
What happens if the number of breeders (the parameters NUM_BREED) is set to a low value?

It takes longer (more generations) for the top fitness to converge if NUM_BREED is set to a lower value. This can be seen in the graph below.