ECE 559 Project #6

This project involves solving a multi-objective optimization problem (MOP) expressed as a set of real-valued functions. Suppose there are *n* decision variables and *m* objectives that must be optimized. Then the MOP is expressed as follows:

*Minimize y = (f1(x), … , fm(x)) where x = (x1, … , xn) ∈ X and (y1, … , ym) ∈ Y. A solution g dominates solution h if and only if ∀ i ∈ {1, … , m} : fi(g) ≤ fi(h) and ∃ j ∈ {1, … , m}: fj(g) < fj(h). A solution g is non-dominated with respect to the set X′⊆ X if and only if no solution in X′ dominates g. A solution is Pareto optimal if and only if it is non-dominated with respect to X′.*

You are to solve a multi-objective problem using a GA with binary encoding for the genotype. (Other GA parameters are your choice.) The problem has *n* = 8 and *m* = 2.



where *xi* ∈[-2, 2].

You are to run your algorithm for 200 generations. Plot the Pareto optimal front for the initial population, at the 100th generation and at the 200th generation.

Give 3 solutions sampled from the Pareto front from the 200th generation.