REPORT
CODING ASSIGNMENT 2

Binary coded GA with Roulette wheel reproduction scheme, two-point crossover and uniform mutation

ME 674 SOFT COMPUTING

Submitted By- Saurav Kamal Medhi
Roll No- 214103430

MTech (Machine Design)

INDIAN INSTITUTE OF TECHNOLOGY, GUWAHATI

Course Instructor- Prof. Sukhomay Pal

Problem Statement

To minimize the following function using Genetic algorithm

$$f(x) = x_1 + x_2 - 2x_1^2 - x_2^2 + x_1 x_2$$

with

$$0 \le x_1 \le 0.5$$

$$0 \le x_2 \le 0.5$$

Approach taken

GA scheme: Binary coded GA

Reproduction scheme: Roulette-wheel selection scheme

Crossover type: Two-point crossover

Mutation: Uniform

User Input

1. Objective function (read from the **input** file)
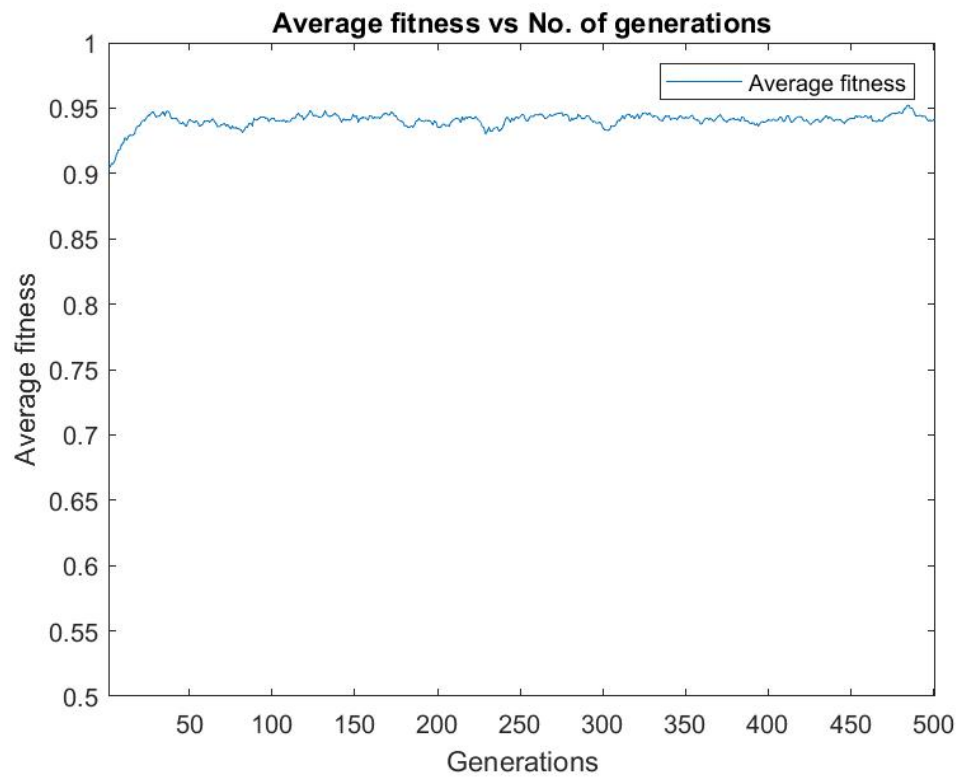2. Population size
3. Crossover probability
4. Mutation probability

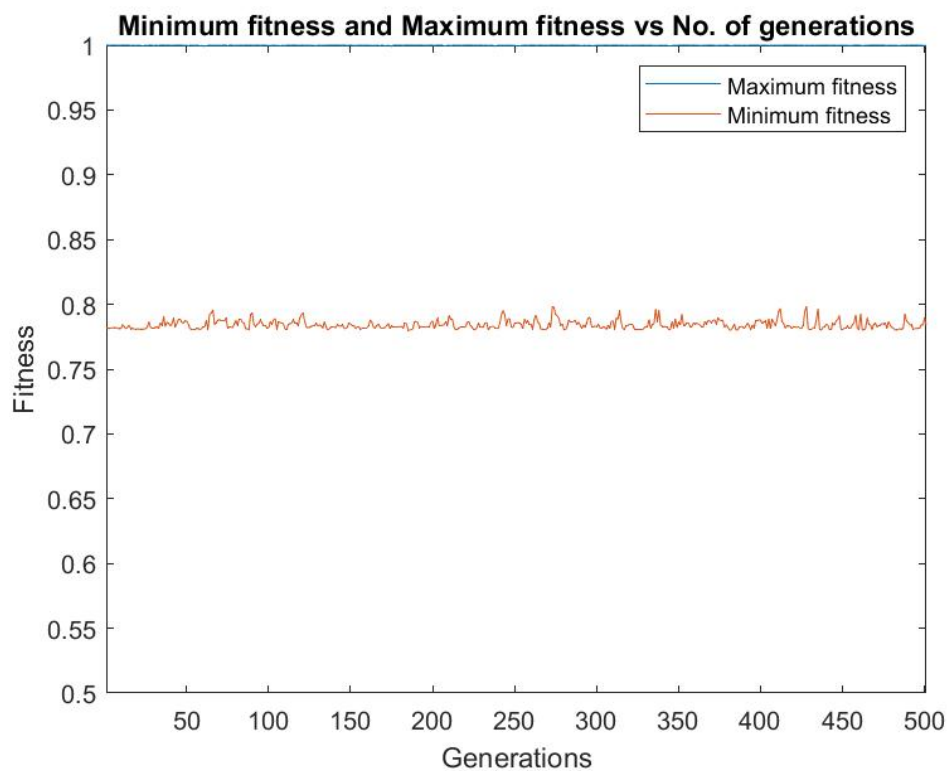# Results from Simulation

Input Parameters

1. Fitness function: $\frac{1}{1+(f(x))^2}$
2. Population size: 1000
3. Sub string length: 20 (for each variable)
4. Crossover probability: 0.90
5. Mutation probability: 0.03
6. No of generations: 500

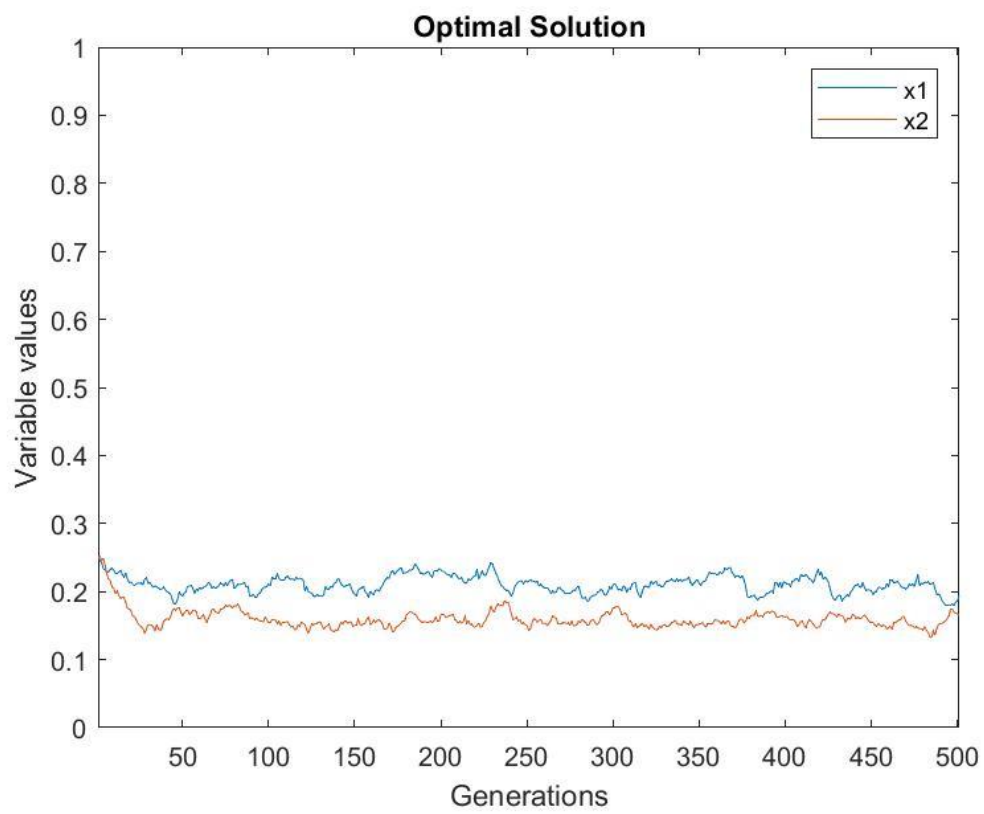The following plots were obtained from the simulation of GA code

Plot 1

Plot 2

Plot 3

Minimum function value = 0.0156

Value of x_1=2.7657e-05

Value of x_2= 6.4850e-05