

Task 4
Student –Polina Rachkovskaya

Algorithm:

$$y1 = (x-2)^2 \text{ and } y2 = (x-4)^2$$

1. Create 20 10-bit binary chromosomes, assuming each chromosome represent x-coordinate ranges from 0 to 6 with (0000· · ·00) and (1111· · ·11) being corresponding to 0 and 6, respectively.
2. Calculate y 1 and y 2 for each of 20 x's represented by these 20 chromosomes.
3. Select individuals uniformly from population.
4. Perform crossover and mutation to create a child.
5. Calculate the rank of the new child.
6. Find the individual in the entire population that is most similar to the child. Replace that individual with the new child if the child's ranking is better, or if the child dominates it.
7. Update the ranking of the population if the child has been inserted.
8. Perform steps 2-6 according to the population size.

Results:

Iteration 1

№	Chromosome	X	Y1	Y2	Rank
1	0111110111	2,950147	0,902779	1,102192	8
2	1001111110	3,741935	3,034339	0,066597	0
3	1101111110	5,243402	10,51965	1,546048	1
4	1000000100	3,026393	1,053483	0,947911	8
5	1011101111	4,404692	5,782544	0,163776	3
6	1101111101	5,237537	10,48164	1,531497	2
7	0000110101	0,31085	2,853226	13,60982	3
8	0000000100	0,02346	3,906709	15,81287	0
9	0111101011	2,879765	0,773987	1,254926	8
10	0110100110	2,475073	0,225695	2,325401	5
11	0000011011	0,158358	3,391646	14,75822	1
12	1010001101	3,829912	3,348578	0,02893	6
13	0111000101	2,656891	0,431506	1,80394	5
14	0000101101	0,26393	3,01394	13,95822	2
15	0111000101	2,656891	0,431506	1,80394	5
16	0111101000	2,86217	0,743337	1,294657	8
17	1000100100	3,214076	1,473981	0,617676	8
18	1011000000	4,129032	4,532778	0,016649	4
19	0001011110	0,55132	2,098675	11,8934	4
20	0100101011	1,753666	0,060681	5,046018	5