Evolutionary Algorithms

Project 1

Find a minimum of the Rosenbrock's (banana) function without constraints:

$$f(x) = \left[1 - x + a\right]^2 + 100\left[y - b - (x - a)^2\right]^2$$

Constants a and b should be unique for each person:

$$a, b = Int\left[4 * rand()\right] / 2$$

where: *Int()* - integer part

rand() - random number generator with the uniform distribution in the range <-1,1>

1. Generate four starting points:

$$x = a + 2 * rand(); \quad y = b + 2 * rand()$$

Create file with values (only) of a, b and all starting points x, y coordinates.

2. Using Matlab's optimization toolbox compare convergence of available unconstrained optimization algorithms.

3. The report, after a <u>short</u> introduction with the function and without theoretical background of optimization algorithms, must present results of calculations. For each starting point:
   a. list: initial and final point, accuracy of the final result, number of iterations and function evaluations (if available) in a convenient form.
   b. draw 2D banana function contour plot with trajectories of various methods runs, plotting a point (current solution) at each iteration.
   c. draw the history of optimization – function value (in logarithmic form) versus iteration count

4. Present conclusions concisely. Attach Matlab code.

   Reports, in pdf format with the name EA_P1_*StudentName,* and parameter file must be delivered by email till:

Deadline: Dec. 17