

IE 310 – Programming Assignment 6

Due on June 26, 2020, 23:59

In this assignment, you are going to write a program which minimizes the convex function with two variables by using the three method below.

- i.) Cyclic Coordinate Search
- ii.) Hook – Jeeves Method
- iii.) Steepest Descent Method

You should write a computer program in C, C++ or Python which correctly implements these methods. The function to be used in this assignment is as follows:

$$f(x_1, x_2) = (5x_1 - x_2)^4 + (x_1 - 2)^2 + x_1 - 2x_2 + 12$$

You need to use exact line search methods to determine the step length at each iteration. You might want to use your bisection or golden section codes you wrote in Assignment 5. You should modify them because the function in this assignment has two variables. You can choose your ε as 0.0001 for stopping conditions if required. You are free to choose any initial points as long as it leads you to the minimum of the function.

Also, be careful about the initial point(s) chosen. (Please do not directly choose the optimum point so that your program stops before less than 5-10 iterations. Also, please do not choose points too far from the optimum point so that you have to report too many iterations.) You can choose your ε as 0.0001 for stopping conditions if required.

You need to report your initial point(s) and value(s), point(s) and value(s) at each iteration, and final local optimum point and value in a spreadsheet table preferably. Summarize your answers in a brief report which includes your tables for each method and include your source code. Please name your folder as “Name-Surname-ID-Assignment6”. Submit your folders via the Moodle page until due time.

You can use this output format.

k	$x^{(k)}$	$f(x^{(k)})$	$d^{(k)}$	$\alpha^{(k)}$	$x^{(k+1)}$
0
1
...					

$$x^* = \dots$$
$$f(x^*) = \dots$$