ME 609: Programming Project Phase # 1

1. Maximize
   $f(x) = (2x-5)^4 - (x^2-1)^3$ in interval (-10, 0)
2. Maximize
   $f(x) = 8 + x^3 - 2x - 2e^x$ in interval (-2, 1)
3. Maximize
   $f(x) = 4x(\sin x)$ in interval (0.5, π)
4. Minimize
   $f(x) = 2(x-3)^2 + e^{0.5x^2}$ in interval (-2, 3)
5. Minimize
   $f(x) = x^2 - 10e^{(0.1x)}$ in interval (-6, 6)
6. Maximize
   $f(x) = 20\sin x - 15x^2$ in interval (-4, 4)

The bounds are given so that you can choose the initial guess for the bounding phase method accordingly.

Deadline for submitting code on MS TEAMS is September 1, 2024.

Guidelines

1. There should be only one file of your program.
2. Program should be written as sub-routines for examples

   Main program()
   Ask input: a,b, etc,
   Call bracketing method and pass inputs a, b, etc, and store the new ranges as x,y, etc.
   Call region-elimination or gradient-based method with new ranges as x,y, etc,
   Save results iteration-wise

   Bracketing method()

   region-elimination or gradient-based method()

   objective function()

   other_functions()

3. Make a powerpoint presentation of the results
   a. Title slide with group number, name and roll number of students
   b. Change values of input parameters (10 times), check optimal solution for different input and function evaluations. Tabulate results
   c. Plots solution with iteration
   d. Extra results/plots and observation
   e. Conclude your Phase-1