Theoretical Models for Computing

Lab #5

Instructor: Dr. Ha Viet Uyen Synh.

1. Develop a program to implement the golden-section search algorithm. The subroutine should have the following features:
   • Iterate until the relative error falls below a stopping criterion or exceeds a maximum number of iterations.
   • Return both the optimal x and f(x).
   Employ the above program to find the maximum of

$$f(x) = 4x - 1.8x^2 + 1.2x^3 - 0.3x^4$$

   where ($x_l = 2$, $x_u = 4$, $\varepsilon_s = 1\%$)

2. Find the minimum value of

$$f(x, y) = (x - 3)^2 + (y - 2)^2$$

starting at x = 1 and y = 1, using the steepest descent method with a stopping criterion of $\varepsilon_s = 1\%$.