MAT 116E Advanced Scientific and Engineering Computing

Lab-7

Q-1. Fibonacci sequence is a series where a number is found by adding up the two numbers before it. The functional definition of this sequence is

$$F(n) = \begin{cases} 0 & , \quad if \ n = 0 \\ 1 & , \quad if \ n = 1 \\ F(n-1) + F(n-2) & , \quad if \ n > 1 \end{cases}$$

Write a MATLAB program, gets a nonnegative integer from the user and prints Fibonacci sequence. An example program input-output should be like

>> Please enter a nonnegative integer: 8

>>The fibonacci sequence will be 0, 1, 1, 2, 3, 5, 8, 13, 21

>> Please enter a nonnegative integer: 1

>>The fibonacci sequence will be 0, 1

Q-2. The (x, y) coordinates of an object (in meters) as a function of time t are given by

$$x(t) = 5t - 10 \qquad y(t) = 25t^2 - 120t + 144$$

The distance of the object from the origin (0,0) is given by $d = \sqrt{x^2 + y^2}$. Create a MATLAB program that uses **WHILE** loop that increments time from $t = 0$ by steps of 0.01 seconds to determine the first time t when the distance from the origin is less than $d = 15$ meters. Plot d versus t, and find the points $(x_{min}, y_{\min})$ that make the distance minimum. Provide a plot title and labels for the axes.