MAT 116E Advanced Scientific and Engineering Computing

Lab-5 / CRN : 12852

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1 Question 1

The electricity accounts of residents in a very small town are calculated as follows:

- if 500 units or less are used the cost is 2 cents per unit.
- if more than 500, but not more than 1000 units are used, the cost is \$10 for the first 500 units, and then 5 cents for every unit in excess of 500
- if more than 1000 units are used , the cost is \$35 for the first 1000 units plus 10 cents for every unit in excess of 1000.
- in addition, a basic service fee of \$5 is charged, no matter how much electricity used.

Write a program which enters the following five consumptions into a vector, and uses a for loop to calculate and display the total charge for each one: 200, 500, 700, 1000, 1500. (\$1=100 cents)

2 Question 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. Provide a plot title and labels for the axes.