

ECE 317
Summer 2005
Lab Assignment #2

1.

Plot $y(t) = (1 - 2e^{-0.25t} \cos(\pi t))u(t)$ for 8 periods of the cosine function, starting at time $t = 0$. Label the X-axis "Time", label the Y-axis "Amplitude", and title the graph "Decaying, Oscillating Exponential".

2.

A) Plot the following functions once on the same graph and once on individual subplots. Evaluate the functions over the interval $0 \leq t \leq 25$ and choose a time step, Δt , of at most 0.01 sec. On all plots, include a descriptive title and limit the range of the Y-axis to $[-0.5, +2]$ and the range of the X-axis to $[0, 18]$. For the graph containing both functions, include a legend to distinguish the functions.

$$y_1(t) = 1.6e^{-t}$$

$$y_2(t) = 1.8e^{-0.4t}$$

B) Determine the value of $y_2(t)$ at the following times: $t = 0$, $t = 4$, and $t = 14$.

3.

A) Plot $y = \frac{2x^3}{2 + x^4}$ for $-10 \leq x \leq 10$. Is the curve even, odd, or neither? **Why?**

B) Determine the maximum and minimum values of y over the specified range. Also, find the corresponding values of x at the maximum and minimum.

4.

Plot the following function, which is defined piecewise. Alternate between solid and dashed lines, and include a legend that describes each piece.

$$f(x) = \begin{cases} \cos(2\pi x) & [-0.5, 0.5] \\ x^2 - 1.25 & [0.5, 2] \\ -4x + 10.75 & [2, 4] \end{cases}$$

5.

Find the roots of the following equation:

$$f(x) = 3x^2 + 100 \text{ sinc}(x) + 2 = 0$$

Describe **in words** the method you used to find them.