



Electrical and Computer Engineering Department
ENEE2313, Signals and Systems,
Assignment
Dr. Mahran Quraan

Question 1:

Generate and plot the following signals using MATLAB:

1. $x_1(t) = 5\sin(100\pi t)$
2. $x_2(t) = 5\sin(100\pi t) + 3\cos(300\pi t)$
3. $x_3(t) = \pi(0.25t - 0.75) + \pi(0.5t - 1.5)$ in the time interval = $[0, 5]$
4. $x_4(t) = 2u(t) - 2r(t) + 4u(t - 2) + 2r(t - 2) - 2u(t - 3)$ in the time interval = $[-4, 4]$

Question 2:

Write the MATLAB scripts that solve the following differential equation using zero initial conditions.

$$0.001 \frac{dy(t)}{dt} + 2y(t) = 5 \cos(1000t)$$

Question 3:

Use Simulink (MATLAB) to simulate the following system then show and plot the impulse and step responses of the system.

$$\frac{d^2y(t)}{dt^2} + 2 \frac{dy(t)}{dt} + y(t) = 2x(t)$$

Question 4:

Write a program that computes and plots the convolution ($x_1(t) * x_2(t)$) of the functions:

$$x_1(t) = \pi \left(\frac{1}{2}t - 2 \right) \quad x_2(t) = e^{-t}u(t - 2)$$

Question 5:

Plot the frequency response (semi-log scale) of a system with the following transfer function:

$$H(s) = 10000 \frac{s + 1}{s^2 + 4s + 2}$$