BIRZEIT UNIVERSITY

Electrical and Computer Engineering Department
ENEE2313, Signals and Systems,
Assignment
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Question 1:

Generate and plot the following signals using MATLAB:

1. $x_1(t) = u(t-6) - u(t-12)$
2. $x_2(t) = u(t-4) + r(t-8) - 2r(t-9) + r(t-13)$ in the time interval = [0, 20]

Question 2:

1. Generate and plot the signals $y_1(t) = \sin(250\pi t)$, $y_2(t) = \cos(1000\pi t)$, then plot the signals $m(t) = y_1 + y_2$ and $n(t) = y_1 - y_2$
2. Determine, using the MATLAB plots, if the sum and/or difference signals are periodic. In case a signal is periodic, determine its fundamental frequency.

Question 3:

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

$$\frac{d^2}{dt^2}y(t) + 2\frac{d}{dt}y(t) + 4y(t) = 5\cos(1000t)$$

Question 4:

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

$$\frac{d^2}{dt^2}y(t) + 2\frac{d}{dt}y(t) + 4y(t) = 5x(t)$$

Question 5:

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

$$x_1(t) = 10e^{-10t}\pi\left(\frac{1}{4}(t-4)\right) \qquad x_2(t) = 10e^{-10t}\cos(100t)\pi\left(\frac{1}{8}(t-6)\right)$$

Question 6:

Use Simulink (MATLAB) to simulate the following system **in Laplace domain** then show and plot the step response of the system.

$$4\frac{d^4}{dt^4}y(t) + 7\frac{d^2}{dt^2}y(t) + 2\frac{d}{dt}y(t) + 3y(t) = 7\frac{d^3}{dt^3}x(t) + 12x(t)$$

Question 7:

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

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