Birzeit University-Faculty of Engineering and Technology
Electrical and Computer Engineering Department
Signals and Systems
MATLAB _Assignment

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Question I:

Generate and plot the following signals using MATLAB:

1. X1(t) = u(t-2)- u(t-9)
2. A finite pulse (π (t)) with value = 8 and extension between 6 and 14
3. $X_2(t)$= u(t-4) +r(t-4)-2r(t-7) +r(t-13) in the time interval [0 16]

Question II:

1. Generate and plot the signals y1(t)= sin 300π(t), y2(t)= cos800πt, then determine y1 and plot the signals m(t)= y1+y2 and n(t)= y1-y2 and g(t)= y1*y2
2. Determine, using the MATLAB plots, if the generated signals are periodic. In case a signal is periodic, determine its fundamental frequency.

Question III:

Write the programs that solve the following differential equations (for t>0) using zero initial conditions.

1. $\frac{dy(t)}{dt} + 20y(t) = 10$
2. $\frac{d^2y(t)}{dt^2} + 2\frac{dy}{dt} + 3y(t) = 10\cos 2000t$

Question IV:

Write the programs that determine the response of the linear time invariant system to the given input and the given initial conditions:

1. $\frac{dy(t)}{dt} + 7y(t) = 10u(t) \qquad y(0) = -3;$

2. $\frac{d^2y(t)}{dt^2} + 3\frac{dy}{dt} + 2y(t) = 5\cos 1500t$ (y (0) =1, y' (0) =2);

Question V:

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

1. $4\frac{d^4y(t)}{dt^4} + 7\frac{d^2y(t)}{dt^2} + 2\frac{dy}{dt} + 3y(t) = 7\frac{d^3x(t)}{dt^3} + 12x(t)$

Question VI:

Write a program that computes and plots the convolution of the functions

$y(t) = (10e^{-0.5t})$ π((t-7)/4), $y(t) = (10te^{-0.5t})$ π ((t-12)/8)