

Birzeit University-Faculty of Engineering and Technology
Electrical and Computer Engineering Department
EE2312 Signals and Systems
MATLAB _Assignment

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Question I:

Generate and plot the following signals using MATLAB:

1. $X_1(t) = u(t-5) - u(t-11)$
2. A finite pulse ($\pi(t)$) with value = 8 and extension between 2 and 9
3. $X_2(t) = u(t-6) + r(t-8) - 2r(t-11) + r(t-13)$ in the time interval [0 18]

Question II:

1. Generate and plot the signals $y_1(t) = \sin 100\pi t$, $y_2(t) = \cos 850\pi t$, then determine y_1 and 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 III:

Write the programs that solve the following differential equations using zero initial conditions.

1. $15 \frac{dy(t)}{dt} + 30y(t) = 10$
2. $\frac{d^2y(t)}{dt^2} + 8 \frac{dy}{dt} + 25y(t) = 5 \cos(1200t)$

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. $\frac{dy(t)}{dt} + 6y(t) = 20u(t) \quad y(0) = 2;$
2. $\frac{d^2y(t)}{dt^2} + 2 \frac{dy}{dt} + 2y(t) = 10\cos(2000t) \quad (y(0) = 2, y'(0) = 4);$

Question V:

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

1. $\frac{d^4y(t)}{dt^4} + 8 \frac{dy(t)}{dt} + 6y(t) = 7 \frac{d^2x(t)}{dt^2} + 12x(t)$
2. $\frac{d^3y(t)}{dt^3} + 2 \frac{dy}{dt} + 4y(t) = 5x(t)$

Question VI:

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

$$y(t) = (10e^{-3t})\pi((t-2)/4), \quad y(t) = (10e^{-3t} \cos 100t) \pi((t-6)/8)$$