Birzeit University-Faculty Of Engineering
Electrical Engineering Department
Control systems I -EE4302
MATLAB _Assignment I

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ABET (K)

Question I:

Generate and plot the following signals using MATLAB:

1. X1(t) = u(t-4)- u(t-7)
2. A finite pulse (π(t)) with value = 4 and extension between 3 and 7
3. X_2(t)= u(t-4) +r(t-6)-2r(t-9)+r(t-11) in the time interval [0 15]

Question II:

1. Generate and plot the signals y1(t)= sin 200π(t) y2(t)= cos750πt , then determine y1 and plot the signals m(t)= +y2 and n(t)= y1-y2
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. $10\frac{dy(t)}{dt} + 20y(t) = 10$
2. $\frac{d^2y(t)}{dt^2} + 2\frac{dy}{dt} + 4y(t) = 5\cos 1000t$

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. $\frac{dy(t)}{dt} + 5y(t) = 10u(t)$ $y(0) = 3;$
2. $\frac{d^2y(t)}{dt^2} + 2\frac{dy}{dt} + 2y(t) = 5\cos 2000t$ (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. $4\frac{d^4y(t)}{dt^4} + 6\frac{dy(t)}{dt} + 8y(t) = 7\frac{d^2x(t)}{dt^2} + 12x(t)$
2. $H(s) = \frac{100(s+3)}{(s+1)*(s+4)} + \frac{10}{(s+10)}$ (Hint: transform to differential equation form)

Question VI:

Write a program that computes and plots the spectral representation of the function

1. $y(t) = (10e^{-10t})$u(t)
2. $y(t) = (10e^{-10t}\cos 100t)$u(t)

Question VII:

Write a program that computes the Laplace transform of the function

3. $y(t) = (10 - 10e^{-5t})$u(t)
4. $y(t) = (30 - 10e^{-8t}\cos 100t)$u(t)

Question VIII:

Write a program that define the transfer functions and plots the zero-pole map of the systems

1. with poles (-1,-3) and zero (-6)
2. with poles (-1, 1+2j and 1-2j) and zero at (-3)

Question IX:

Write a program that determine the inverse Laplace transform of the transfer functions in VIII.