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%Question 1: TO COMPUTE FOURIER TRANSFORM OF  $x_1(t) = \exp(-2t)u(t)$  and
plot the magnitude and phase spectra

close all; %close all open windows generated previously
clc; %clear the command window
clear all; %clear the variables

T0 = 4; %Time period of signal
Ts = 1/64; %Sampling interval
N = T0/Ts; %Total number of samples
w0 = 2*pi/T0; %Frequency of signal

X = zeros(256,1); %Rth sample of frequency domain representation of
signal
for r = 1:1:256 %taking 256 samples
    for k = 0:1:N-1 %k is the index of summation from k equals 0 to N-1
        %For the rth sample of the fourier transform, X_r=X(rw0):
        X(r) = X(r) + Ts*exp(-2*k*Ts)*1*exp(-j*(r-1)*w0*k*Ts);
    end;
end;

r = 1:1:256; %r is the index for 256 samples of Xr
w = r.*w0; %Frequency varies with r
t = 0:0.1:10; %Time array

x1 = exp(-2.*t)*1; %Time domain aperiodic signal x1(t).u(t)=1 for
all t.

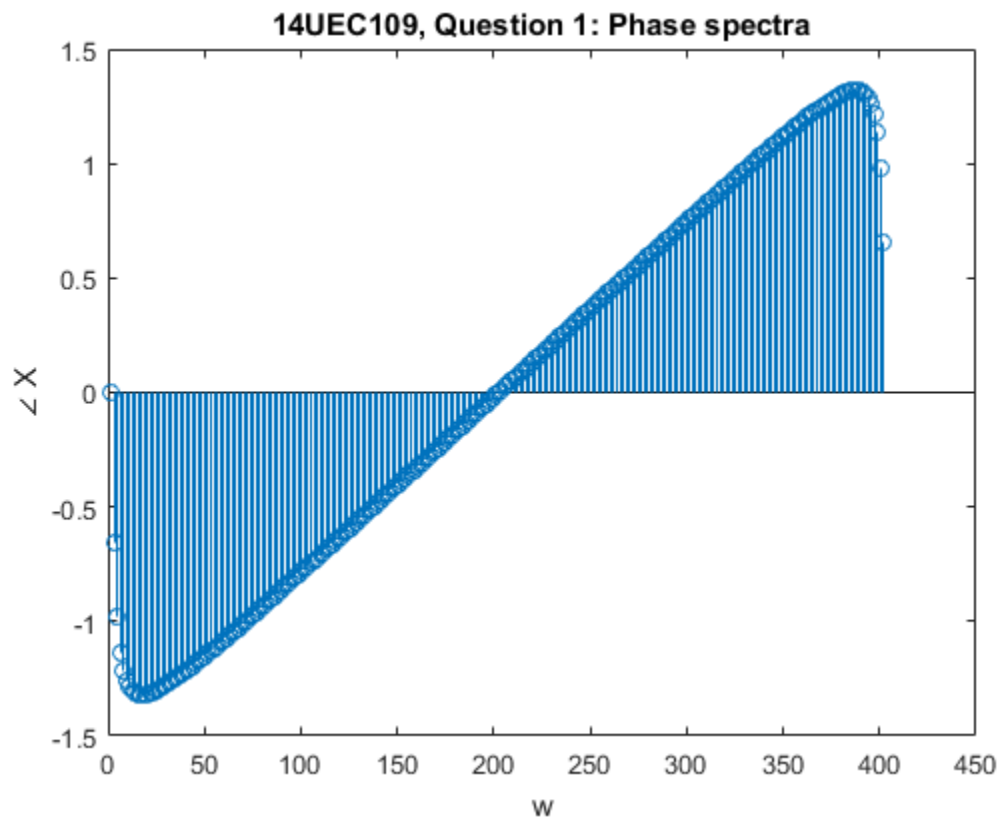
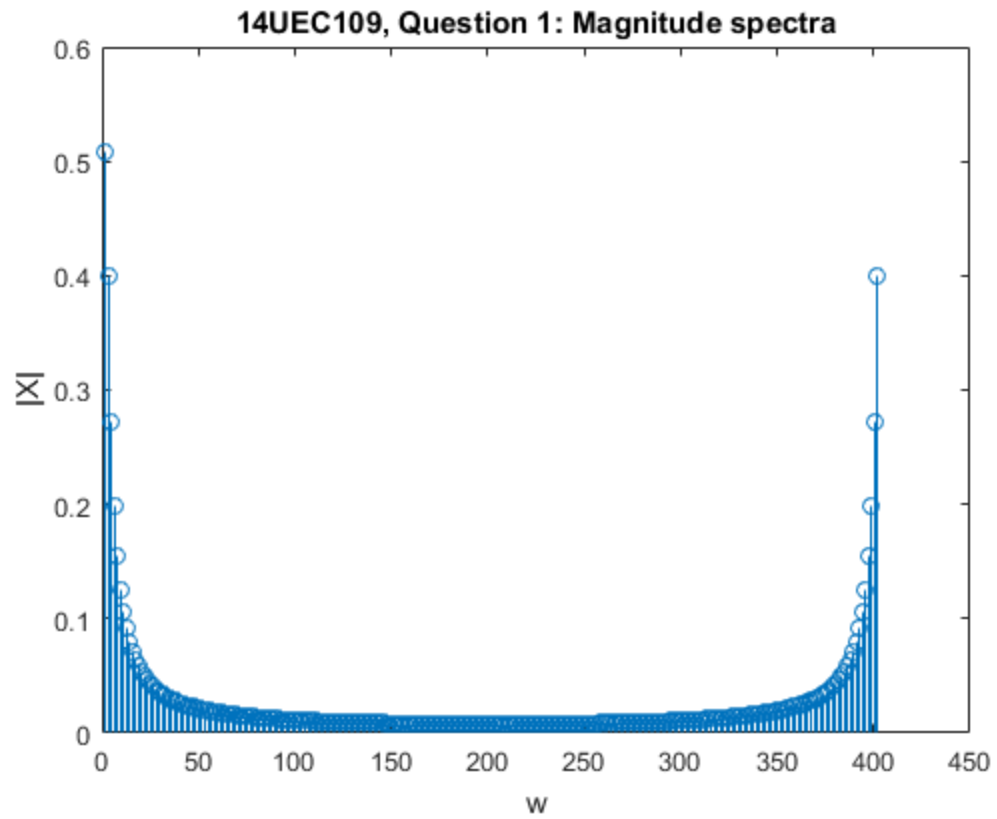
figure(1) %Figure for the magnitude spectrum
stem(w,abs(X)) %Discrete plot for  $|X(w)|$  vs w
xlabel('w') %Label for X-Axis of the plot
ylabel('|X|') %Label for Y-Axis of the plot
title('14UEC109, Question 1: Magnitude spectra') %Title for plot

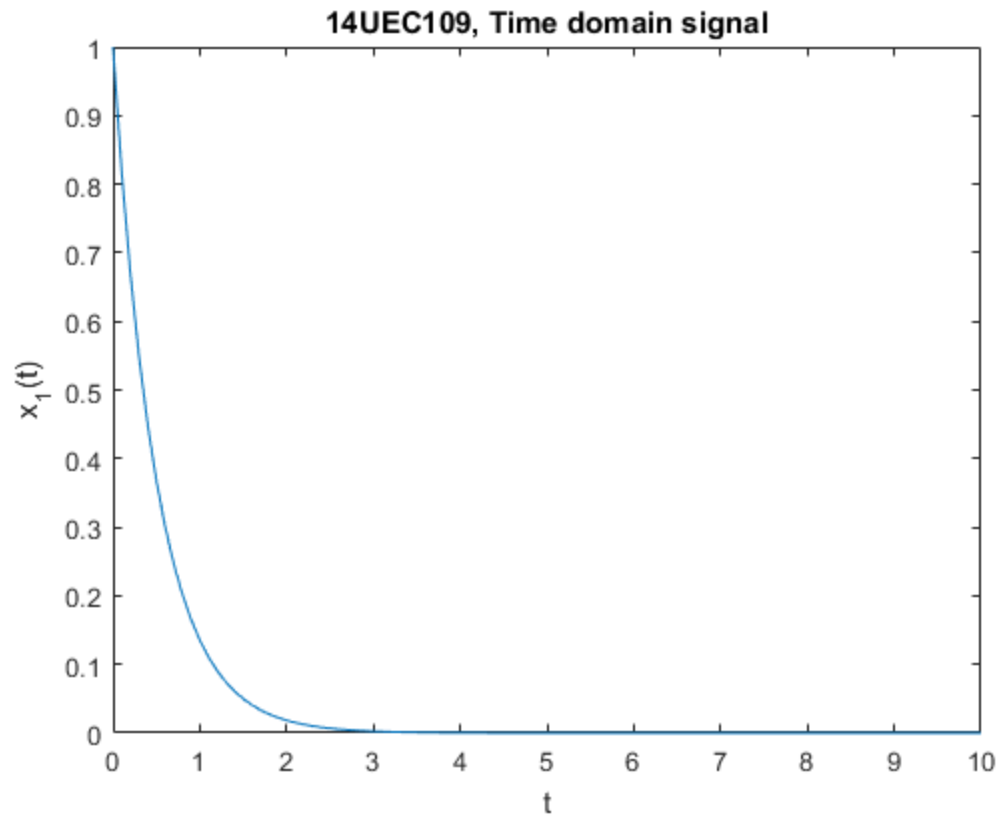
figure(2) %Figure for the phase spectrum
stem(w,angle(X)) %Discrete plot for phase of
X(rw0) vs w
xlabel('w') %Label for X-Axis of the plot
ylabel('\angle X') %Label for Y-Axis of the plot
title('14UEC109, Question 1: Phase spectra') %Title for plot

figure(3) %Figure for the phase spectrum
plot(t,x1) %Continuous plot for time domain
signal x1(t)
xlabel('t') %Label for X-Axis of the plot
ylabel('x_1(t)') %Label for Y-Axis of the plot
title('14UEC109, Time domain signal') %Title for plot

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