Lab 1: Functions, Convolution and DTFT

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EE153

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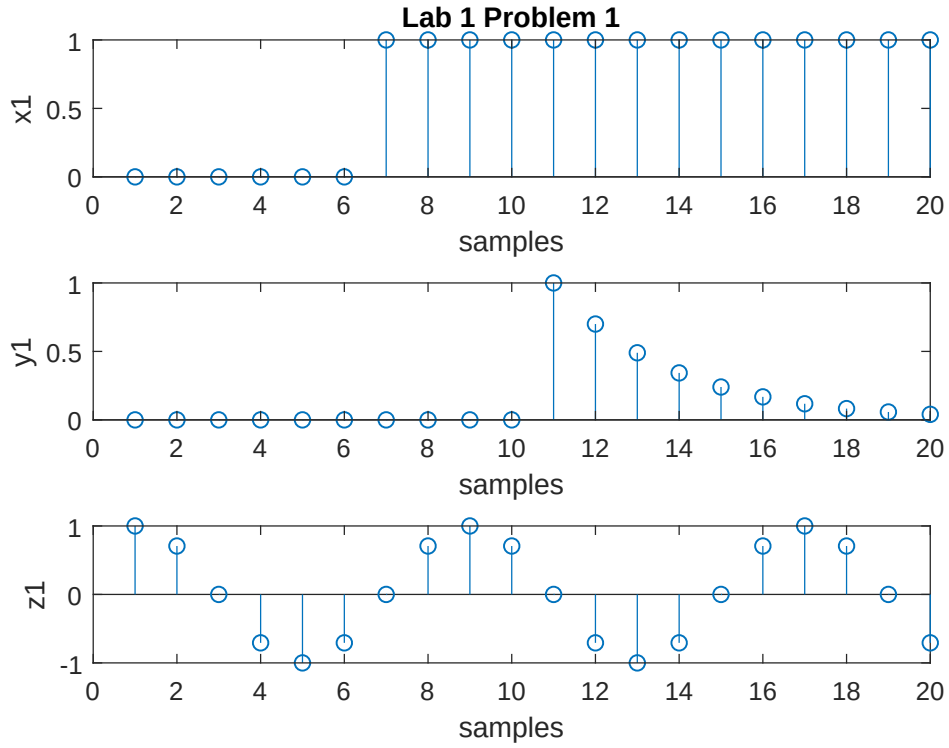


Figure 1: While playing around with parameters for the 3 functions, I remembered that I had a hard time believing the periodicity of sinusoids in frequency. To test this, I compared the plots of cosine functions with periods pi/4, pi/4 + 2pi and pi/4+4pi and found they were all identical.

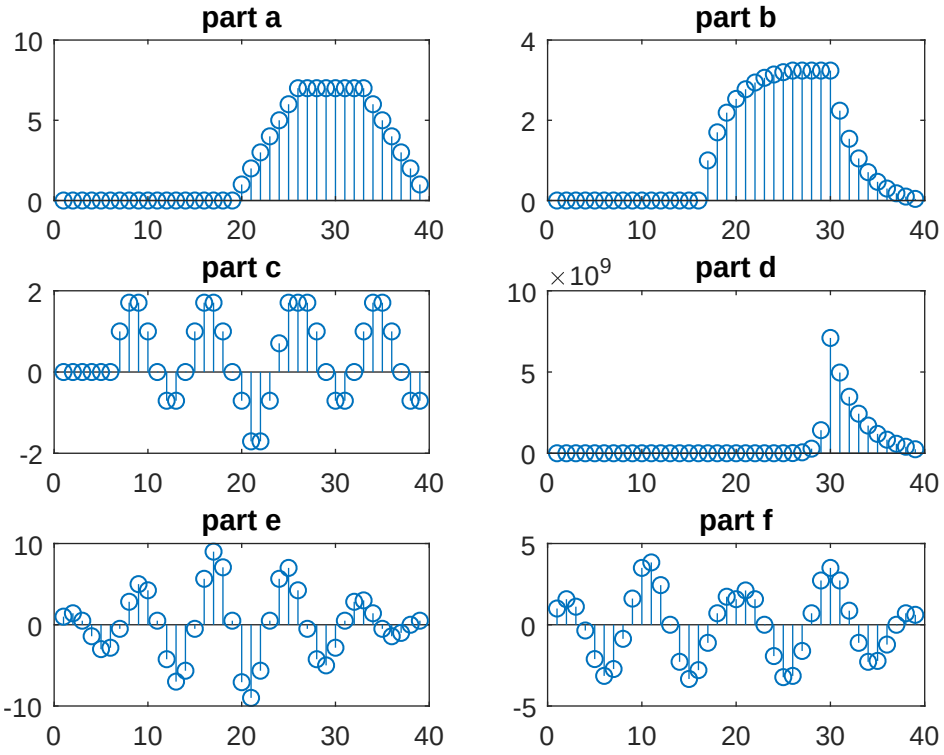


Figure 2: These plots were done using the vector generated from 'conv(x,y)' without a third argument. They are the entire results of each pair of vectors convoluted together. One thing to note about a and b is that the each of the plots decrease in value after they have peaked time. This should not happen if the step functions existed for all of time. This happens because the vectors do not exist for all time, but only for 20 samples each, and the conv function is taking the sum of the products of each corresponding pair for any full or partial amount of overlap between the two vectors. This means that as the step function is 'leaving to the right', the amount of vector overlap decreases, and so the value of the sum decreases as well.

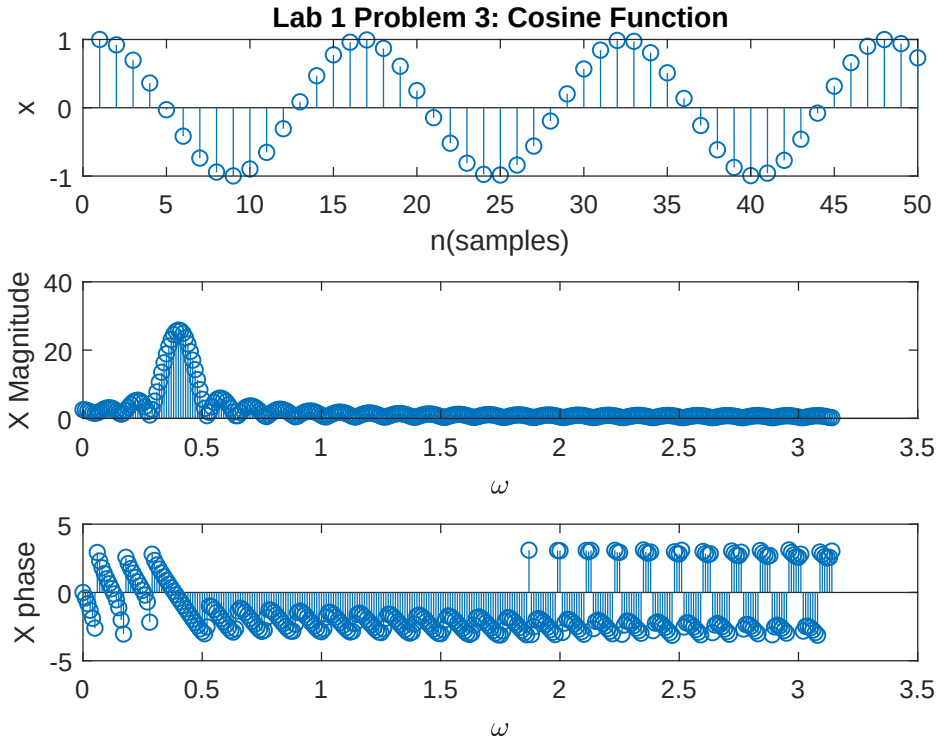
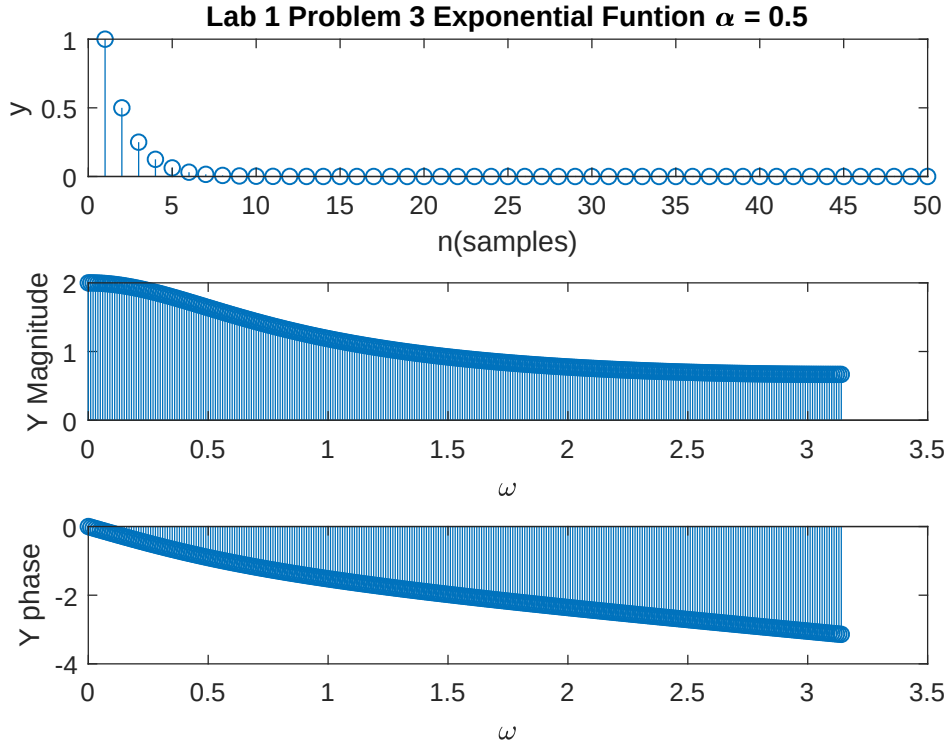
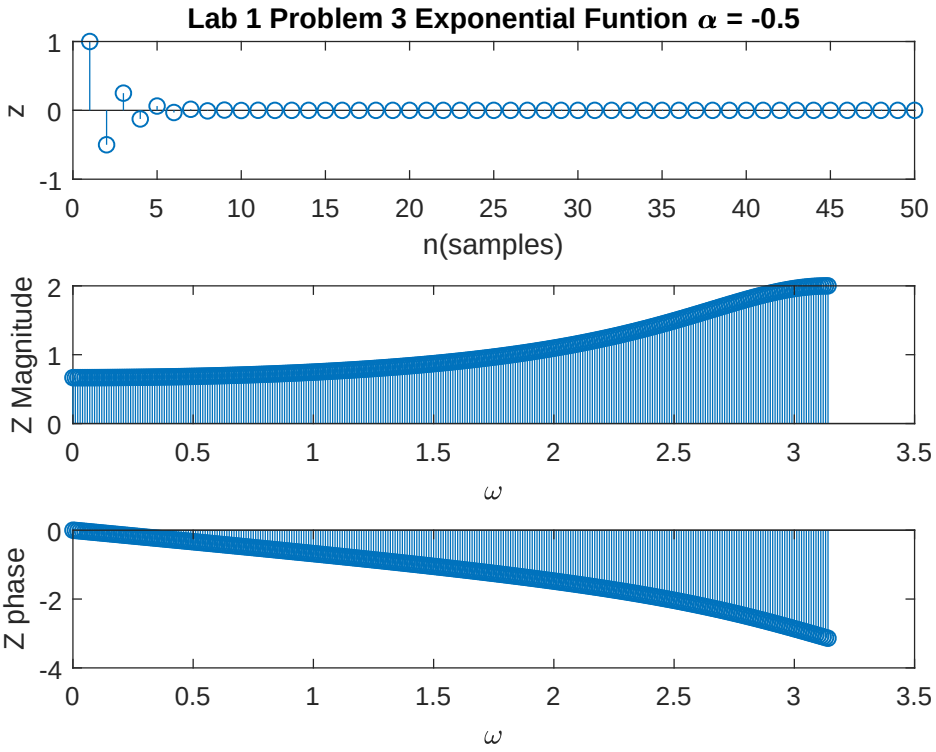


Figure 3: Cosine function and its DTFT




Lab 1 Problem 3 Exponential Funtion α = -0.5
z
n(samples)
Z Magnitude
ω
Z phase
ω