**Khulna University of engineering & Technology**

**Department of Electronics and Communication Engineering**

**Digital Signal Processing Laboratory (ECE-3204)**

**Home tasks: Write MATLAB codes for the following problems. Follow the instructions strictly. Use figure caption and the x-and-y axis labels properly.**

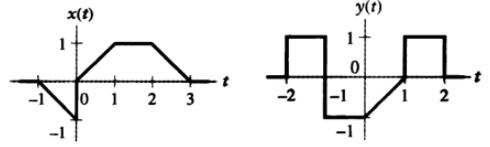
1. **Plot The following signals using user defined functions:**

**A.**

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**Plot all the signals in one figure and distinguish them by different colors.**

1. **Consider the sinusoidal signal and show that the sampling frequency of 10 times the maximum frequency performs better than 1.5 times to reconstruct the signal.**
2. **Add two Uniformly distributed random signals individually to a same cosine signal. Plot the noisy signals and compare their histograms in the same figure using subplot.**
3. **Plot the following figures as shown in figure 01 using MATLAB. Do not use ‘ones()’ and ‘zeros()’.**



**Fig.01**

1. **Consider an input signal and the LTI system has an impulse response of Plot both the input and the impulse response, also show the convolved signal on the same figure.**
2. **Given an input signal . Find the Fast Fourier Transform of input sequence. Also find the magnitude response, phase response and the Inverse Fast Fourier Transform. Plot the input and all the outputs in the same figure to compare the results.**
3. **The transfer function of an IIR filter is given by , find and plot the filtered output. Also, find the poles and zeros and plot them in the z-plane. Again, find the second order section for cascade realization.**
4. **A lowpass, discrete-time filter, with Butterworth characteristics is required to meet the following specifications:**

**Cutt-off frequency : 350Hz**

**Filter order : 4**

**Sampling frequency: 2000Hz**

**With the aid of MATLAB, obtain and plot**

**A. The magnitude- frequency and group delay responses of the filter using the impulse invariant method;**

**B. The magnitude- frequency and group delay responses of the filter using the bilinear z-transform method;**