

Assignment #5 CE242 : Signals & Systems
Dept. of Computer Engineering
Sharif University of Technology
Spring 2006

Distributed : 2/13

Due: 2/26

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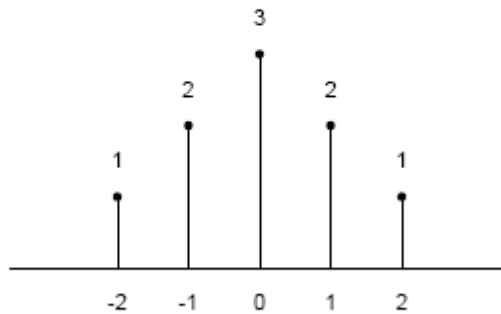
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1) Calculate the Discrete-Time Fourier Transform of the following signals:

a) $x_1[n] = \left(\frac{1}{3}\right)^{|n|} u[-n-2]$

b) $x_2[n] = \left(\frac{1}{2}\right)^{|n|} \cos\left(\frac{\pi}{8}(n-1)\right)$

c) $x_3[n]$ (shown below)



d) $x_4[n] = \cos\left(\frac{\pi}{8}n\right)$

e) $x_5[n] = (\delta[n-1] + \delta[n+1])^{10}$

2) 5.23 of the textbook.

3) 5.12 of the textbook.

4) 5.27 of the textbook.

5) Consider a discrete time signal $x[n]$ with Fourier transform $X(e^{j\omega})$. We make another signal from this signal with following relation:

$$y_1[n] = \begin{cases} x\left[\frac{n}{M}\right] & n = kM \\ 0 & \text{otherwise} \end{cases}$$

Find the Fourier transform of $y_1[n]$ in terms of $X(e^{j\omega})$.