ECE 3510 homework # Z1 Due:

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4/13/06

1. Problem 6.1 (p.186) in the Bodson text. Find $x(0)$ if the z-transform of $x(k)$ is

   a) $X(z) = \dfrac{a \cdot z - 1}{z - 1}$ b) $X(z) = \dfrac{z}{z^2 - a \cdot z + a^2}$

2. Problem 6.3 in the text. Use partial fraction expansions to find the $x(k)$ whose z-transform is

   a) $X(z) = \dfrac{1}{(z-1)\cdot(z-2)}$ b) $X(z) = \dfrac{z}{z^2 - 2 \cdot z + 2}$

3. Problem 6.4 in the text. Sketch the time function $x(k)$ that you would associate with the following poles. Only a sketch is required, but be as precise as possible.

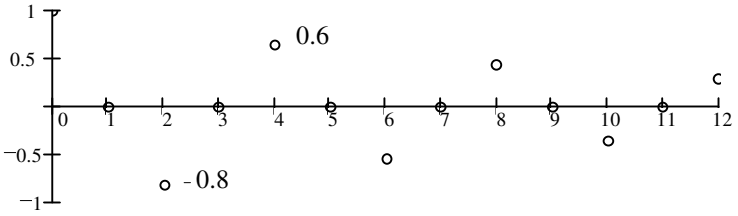
   a) $p_1 = 0.9 \cdot j$, $p_2 = -0.9 \cdot j$ b) $p_1 = 1$, $p_2 = -1$ c) $p_1 = 0.3$, $p_2 = 0.9$ d) $p_1 = e^{j \cdot \frac{\pi}{6}}$, $p_2 = e^{-j \cdot \frac{\pi}{6}}$

Answers

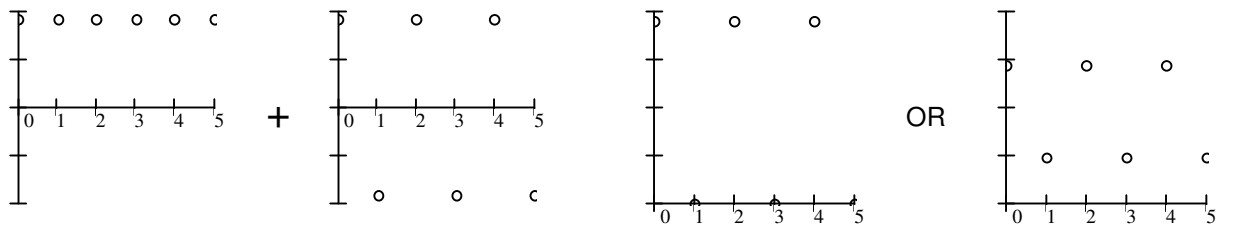
1. a) a b) 0 2. a) $\dfrac{1}{2} \cdot \delta(k) - 1 + \dfrac{1}{2} \cdot 2^k$ b) $\left(\sqrt{2}\right)^k \cdot \sin\left(\dfrac{\pi}{4} \cdot k\right)$

3. Actual signals may have different magnitudes and/or phase angles. You can't tell those things from the pole locations.

   a) $x(k) = 0.9^k \cdot \cos\left(\dfrac{\pi}{2} \cdot k\right)$

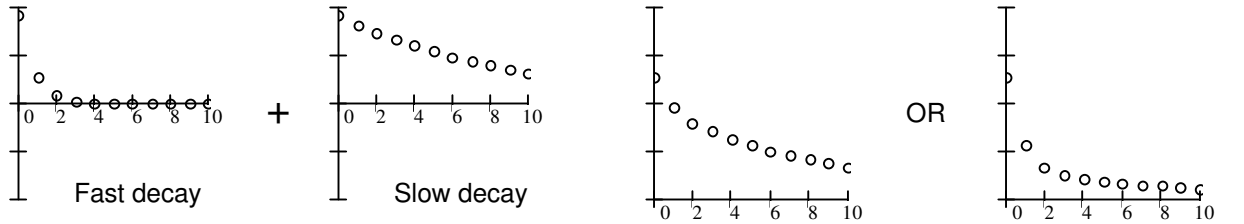


   b)



   Or many others, depending on relative magnitudes

   c)



   Or many others, depending on relative magnitudes

   d) $x(k) = \cos\left(\dfrac{\pi}{6} \cdot k\right)$