

ECE 3510 homework # 20

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4/13/06

1. Problem 6.1 (p.180) in the text. Find $x(0)$ if the z-transform of $x(k)$ is

a) $X(z) = \frac{a \cdot z - 1}{z - 1}$

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

2. Problem 6.3 (p.181) in the text. Use partial fraction expansions to find the $x(k)$ whose z-transform is

a) $X(z) = \frac{1}{(z - 1) \cdot (z - 2)}$

b) $X(z) = \frac{z}{z^2 - 2 \cdot z + 2}$

3. Problem 6.4 (p.181) 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.

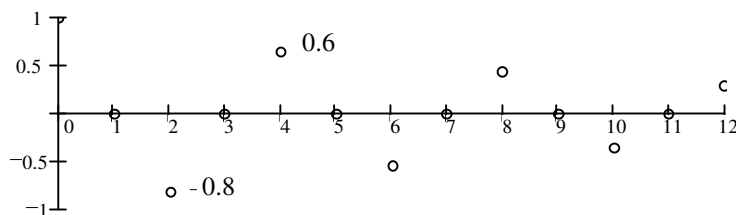
a) $p_1 = 0.9 \cdot j$, $p_2 = -0.9 \cdot j$ b) $p_1 = 1$, $p_2 = -1$ c) $p_1 = 0.3$, $p_2 = 0.9$ d) $p_1 = e^{j \cdot \frac{\pi}{6}}$, $p_2 = e^{-j \cdot \frac{\pi}{6}}$

Answers

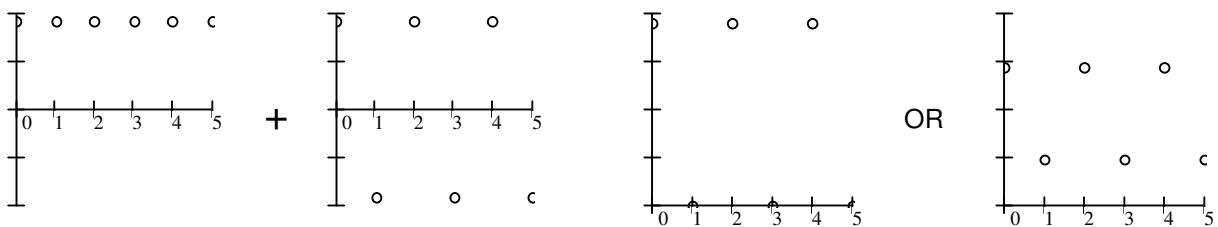
1. a) a b) 0 2. a) $\frac{1}{2} \cdot \delta(k) - 1 + \frac{1}{2} \cdot 2^k$ b) $(\sqrt{2})^k \cdot \sin\left(\frac{\pi}{4} \cdot k\right)$

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

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

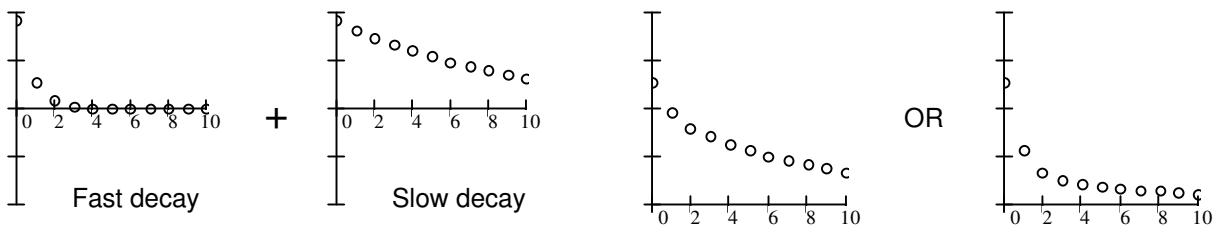


b)



Or many others, depending on relative magnitudes

c)



Or many others, depending on relative magnitudes

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

