

ECE 3510 homework # 21 Requires action on Thur, 4/17/08 Due Mon, 4/21/08

Go to ME Design day in the Union, Thur, 4/17. Write several paragraphs about what you see there. Especially:

1. Note control systems and/or systems with feedback.
2. Tell which senior project most impressed you and why.
3. Observe some at least part of one of the competitions and write at least a paragraph about it (suggest improvements).

ECE 3510 homework # 22 Due Tue, 4/22/08

A.Stolp
4/16/06

1. Problem 6.6 (p.182) in the text.
2. Problem 6.7 (p.182) in the text.
3. Problem 6.8 (p.183) in the text
4. Problem 6.9 (p.183) in the text
5. Problem 6.10 (p.183) in the text

Answers

1. (6.6) a) $x(k) := -4 \cdot \delta(k) + 2 + 2 \cdot \sqrt{2} \cdot \cos\left(\frac{\pi}{2} \cdot k + \frac{\pi}{4}\right)$

$x(0) = 0 \quad x(1) = 0 \quad x(2) = 0 \quad x(3) = 4 \quad x(4) = 4 \quad x(5) = 0 \quad x(6) = 0 \quad x(7) = 4 \quad x(8) = 4$

2. (6.7)	<u>Bounded</u>	<u>Converges</u>	$x(\infty)$	3. (6.8) a)	yes
a)	yes	yes	0	b)	yes
b)	yes	yes	0	c)	no
c)	yes	no	0	d)	yes
d)	yes	yes	8/9	e)	no
e)	yes	yes	2	f)	yes
f)	no				
g)	yes	no			
h)	yes	yes	1		

4. (6.9) a) $H(z) = \frac{z^2}{z^2 - a \cdot z + a^2}$ stable if: $|a| < 1$ b) $H(z) = \frac{12 \cdot z^2 + 48 \cdot z - 3}{z \cdot (2 \cdot z - 1)}$ stable

5. (6.10) a) $H(z) = \frac{z^2}{z^2 - z - 1}$ unstable b) $\frac{1 + \sqrt{5}}{2} = 1.618$

ECE 3510 homework # 23 Due Wed, 4/23/08

May be handed in with the final, Fri 4/25, 10:30 am

1. Problem 6.11 (p.184) in the text.
2. Problem 6.12 (p.184) in the text.
3. Problem 7.1 (p.216) in the text
4. Problem 7.2 (p.216) in the text

Answers

1. (6.11) a) gain = $-\frac{2}{3}$ $y_{ss} = -2$ b) $2 \cdot e^{j \frac{\pi}{2}}$ (frequency response) $-2 \cdot \sin\left(\frac{\pi}{2} \cdot k\right)$

2. (6.12) $a = 1$ $g < 1$

3. (7.1) a) $H_d(z) = \frac{z \cdot (T - 1 + e^{-T}) + (1 - e^{-T} - T \cdot e^{-T})}{(z - 1) \cdot (z - e^{-T})}$

b) $H_d(z) = \frac{(1 - \cos(T)) \cdot (z + 1)}{z^2 - 2 \cdot \cos(T) \cdot z + 1} = 0 @ T = 2 \cdot \pi$

4. (7.2) 60·Hz