ECE 3510 homework # 17 Due Thur, 4/20/06

A.Stolp
4/26/06

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

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

2. (6.7)

	Bounded	Converges	x(∞)	
a)	yes	yes	0	
b)	yes	yes	0	vanishes in a finite time (all poles are at zero)
c)	yes	no		
d)	yes	yes	8/9	
e)	yes	yes	2	
f)	no			
g)	yes	no		
h)	yes	yes	1	

3. (6.8) a) yes
   b) yes
   c) no
   d) yes
   e) no
   f) yes

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 # 18 Due Mon, 4/24/06

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) $2\cdot e^{j\cdot\frac{\pi}{2}}$ (frequency response) $-2\cdot\sin\left(\frac{\pi}{2}\cdot k\right)$

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

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

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) $60\cdot Hz$

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