Homework Set 9 **EECS 206** **Due: Friday., March 22, 2002**

Relevant reading materials: Chapter 5, Section 5.4. Chapter 6, Sections 6.1, 6.2, 6.4, 6.5.

Relevant lectures: 3/11, 3/13, 3/15, 3/18

Relevant items in DSP First DC: Homework Problems: **Chapter 5,** Chapter 6: Demos on Cascading FIR filters, and Introduction to FIR filters, Homework Problems: 6.2, 6.2, 6.9-6.26, 6.29, 6.30, 6.34

Homework submission policies: As usual.

1. 5.9, p. 155

2. 6.4, p. 196

3. 6.6, p. 196

4. 6.8, p. 196

5. 6.18, p. 200

6. Find the coefficients of two first-order FIR filters such that when cascaded, the overall frequency response is

$$H(\hat{\omega}) = 2 + 3\,e^{-j\hat{\omega}} - 2\,e^{-j2\hat{\omega}} .$$

Hint: Try factoring.

7. The signal x[n] is the input to an FIR filter with frequency response

$$H(\hat{\omega}) = 1 - 2\,e^{-j\hat{\omega}} .$$

The signal x[n] is periodic with period 8. Its 8 point DFT is

$$X[0] = 2,\ X[1] = 0,\ X[2] = 1,\ X[3] = j,\ X[4] = 0,\ X[5] = -j,\ X[6] = 1,\ X[7] = 0 .$$

Find the output signal y[n].