EECS 216 – Winter 2008

Homework #2 – Assigned Jan. 15 – Due Tuesday Jan. 22

Grading: Not all problems will be graded, but you should do all of them.
Submission: Submit in *black box in room 4230 EECS* **before** 5 pm on Tuesday.
Relevant Lectures: January 15-17.
Relevant Reading in Textbook: Chapter 2 (LTI systems) 2.1,2.2,2.4.
Section 2.3 (convolutions) will be on HW #3.

1. *(48 points: 8+8+8+8+8+8)* Text #2.1(a),(b),(d),(e),(f),(k) p. 96.

   Is each of 6 systems: (i) linear (ii) time-invariant

   Is each of 6 systems: (iii) causal (iv) have memory?

   Answer "Yes" or "No" for each of the 24 questions.

   Put your answers in the form of a table.

2. *(12 points: 4+4+4)* Text #2.15(a),(b),(c) p. 100. LTI to find outputs.

3. *(20 points: 10+10)* A system has the following property:

   Its response to a sum of inputs is the sum of its responses to the inputs.

   (a) Prove that the scaling property holds for any integer scaling factor.

   (b) Prove that the scaling property holds for any rational scaling factor.

4. *(20 points: 5+5+5+5)* Evaluate the following integrals:

   (a) $\int_{-\infty}^{\infty} \cos(3t)\delta(t)dt$

   (b) $\int_{-\infty}^{\infty} \cos(3t)\delta(t-1)dt$

   (c) $\int_{-\infty}^{\infty} \cos[3(t-1)]\delta(t-1)dt$

   (d) $\int_{-\infty}^{\infty} \cos[3(t-1)]\delta(t+2)dt$