EECS 216 – Winter 2008

Homework #3 – Assigned Jan. 22 – Due Tuesday Jan. 29

Grading: Not all problems will be graded, but you should do all of them.
Submission: Submit in *black box in room 4230 EECS* **before 5:00** on Tuesday.
Relevant Lectures: January 22-24 (and earlier ones too!)
Relevant Reading in Textbook: Section 2.3 (convolution); 2.5 (diff. eqns.)

1. *(20 points: 4+4+4+4+4)* Text #2.11(a),(b),(d),(f),(g) p. 99. Causal, BIBO.

2. *(15 points)* Text #2.14 p. 100. Series/parallel connections; BIBO stable.

3. *(40 points: 10+10+10+10)* Compute the following convolution integrals:

   (a) $y(t) = e^{-3t}u(t) * u(t+3)$

   (b) $y(t) = [u(t+3) - u(t-1)] * u(-t+4)$

   (c) $y(t) = (2\delta(t+1) + \delta(t-5)) * u(t-1)$

   (d) $y(t) = [2\delta(t) + \delta(t-2)] * \sum_{p=0}^{\infty}(\frac{1}{2})^p \delta(t-p)$

   Before you pass out, look at each one–they simplify greatly.

4. *(25 points: 5+5+5+10)* A system has transfer function $H(s) = \frac{10}{s+4}$.
   Compute $y(t)$, $-\infty < t < \infty$, for the following $x(t)$, $-\infty < t < \infty$:

   (a) $3e^{j4t}$

   (b) $3\cos 4t$

   (c) $3\sin(4t + \frac{\pi}{3})$.

   (d) $(\cos 2t)^2$ HINT: Use a trig identity.