EECS 216 – Winter 2008

Homework #6 – Assigned Feb. 19 – Due Tuesday March 4

- **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 Tues. Mar. 4.
- **Note:** You have two weeks to do this set; try to finish before winter break.
- **Read:** Text sections 4.1-4.3. **Topic:** Fourier transforms and properties.
- **Next week:** Applications of Fourier transform: sampling and modulation.
- Have a good winter break!–SL & AY

1. *(30 points: 6@5)* Text #4.5abcfgi. Express your answers in terms of $rect, \delta$, etc.
   $rect(\omega) = \begin{cases} 1 & \text{for } |\omega| < \frac{1}{2} \\ 0 & \text{otherwise} \end{cases}$ so that $X(\omega) = \begin{cases} 1 & \text{for } 0 \le \omega \le 2 \\ 0 & \text{otherwise} \end{cases}$ and $x(t)$ is NOT real.
2. *(15 points: 5+10)* Text #4.14. See table on page 172.
   - Indefinite integral: $\int \frac{1}{t^2+a^2} dt = \frac{1}{a} \tan^{-1} \frac{t}{a} + C$.
   - Compare to Example #4.3.6 on p. 180-181.
3. *(15 points: 5+5+5)* Text #4.24. This should be very easy if you sketch the spectra.
4. *(20 points: 10+10)*, Text #4.19. In Fig. P4.19 change ω_m to $\omega_m/2$.
5. *(20 points: 4@5)* Text #4.11. Using Fourier transforms to compute definite integrals.
   - Use the table on p. 172-173 to get Fourier transform pairs.
   - Compare this to the infinite series in HW #5 problem #5