HOMEWORK #2

Due Friday, January 25, 2008 (5:00 p.m.)

Note: Yujia's office hours have been changed to Thursday, 11:30–1:30 p.m.

Reading: Chapter 2 (2.1–2.4)

Problems:

1. For two real-valued signals $g_1(t)$ and $g_2(t)$, show that

$$\int_{-\infty}^{\infty} \mathrm{Re}[g_{1+}(t)]\mathrm{Re}[g_{2+}(t)]dt = (1/2)\mathrm{Re}\left[\int_{-\infty}^{\infty} g_{1+}(t)g_{2+}^{*}(t)dt\right].$$

2. For amplitude modulation with carrier $A_c\sin(2\pi f_c t)$ and message $A_m\sin(2\pi f_m t)$, find and sketch the spectrum of
$$s(t) = A_c[1 + k_a m(t)]\sin(2\pi f_c t).$$

   How does your result differ from that in class?

3. Problem 2.4

4. Problem 2.6

5. Problem 2.7

6. Problem 2.9