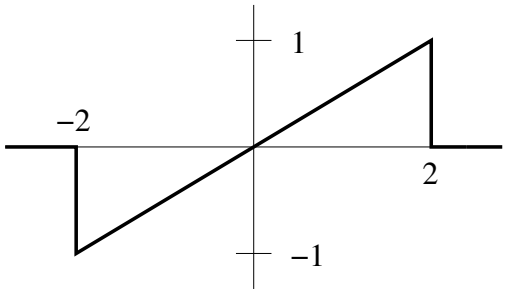
EE 341 - Homework 5

Due September 30, 2005

For problems which require MATLAB, please include a MATLAB m-file which shows how you made your plots.

1. Problem 4.1
2. Problem 4.6. Do for Figure 4.6 (e) only (on page 196). For parts (ii) and (iii), use MATLAB.
3. Problem 4.7 (a), (b), (c), (d). For (c) and (d), use trigonemetric identities to convert the representations of the signals into ones which do not have multiplications of sinusoids.
4. Problem 4.12 (a) (b).
5. The Fourier transform of $x(t)$ is $p_2(\omega)$. Use the properties of the Fourier transform to find the Fourier transforms of the following functions (without using the inverse Fourier transform to calculating $x(t)$).
   (a) $v(t) = x(5t - 4)$
   (b) $v(t) = tx(t)$
   (c) $v(t) = x(t)e^{j2t}$
   (d) $v(t) = \frac{d^2x(t)}{dt^2}$
   (e) $v(t) = x^2(t)$
6. Problem 4.16 (a) (c).
7. Below are some continuous-time signals. Answer the questions about the Fourier transforms of the signals. Be sure to explain your answers.
   (a)



   i. Is $X(\omega)$ real, imaginary or complex?
   ii. Is $\int_{-\infty}^{\infty} X(\omega)\, dw$ equal to zero?
   iii. Is $X(\omega)$ periodic?

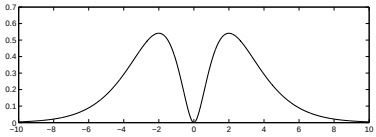
(b) $x(t) = \delta(t-2)$

i. Is $X(\omega)$ real, imaginary or complex?

ii. Is $\int_{-\infty}^{\infty} X(\omega)\, dw$ equal to zero?

iii. Is $X(\omega)$ periodic?

(c)



i. Is $X(\omega)$ real, imaginary or complex?

ii. Is $X(\omega)$ imaginary?

iii. Is $\int_{-\infty}^{\infty} X(\omega)\, dw$ equal to zero?

iv. Is $X(\omega)$ periodic?