ECE2311 Homework Assignment Number 2
Due by 10:50am on 30-Mar-2010

Try to do some of these problems each day; don't wait until the last minute. Be sure your name and ECE box appear legibly on the front page. Show all work, and keep your work neat and organized. Whenever appropriate, use *words* to explain what you are doing, not just mathematical symbols. Be sure to justify your answers so the grader can be confident that you aren't just guessing.

1. 2 points. Lathi 1.1-9. Hint, you might want to sketch $\int_{-T/2}^{T/2} x^2(t)\,dt$ and $\frac{1}{T}\int_{-T/2}^{T/2} x^2(t)\,dt$ as functions of T to determine the power of this signal.

2. 6 points total. Suppose you have the RC circuit shown in Figure 1 below.

   (a) 2 points. Using standard circuit analysis techniques, write a differential equation relating the input and the output.

   (b) 2 points. Find a general expression for the unit impulse response of this system as a function of R and C and sketch it for the case $R = 1$ and $C = 0.1$.

   (c) 2 points. Find a general expression for the unit step response of this system as a function of R and C and sketch it for the case $R = 1$ and $C = 0.1$.

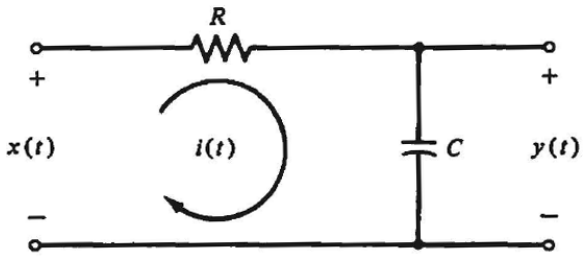

Figure 1: Circuit for problem 2.

3. 3 points. Lathi 2.4-6 using the convolution integral.

4. 4 points. Lathi 2.4-7 using the tables in your book.

5. 4 points. Lathi 2.4-18 (a) and (d) using the graphical techniques described in class.