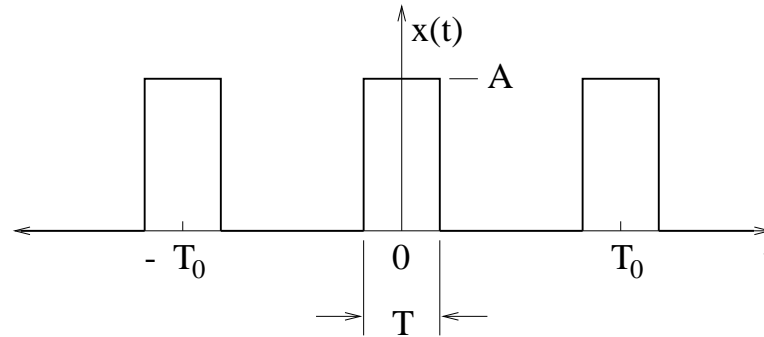


HOMEWORK ASSIGNMENT 1

Reading: Text, Sections 2.1 - 2.3, Lathi, Chapter 2

Due Date: January 30, 2003 (in class)

- Let a system be defined by $y(t) = \frac{1}{2T} \int_{t-T}^{t+T} x(v) dv$. Is this system causal? What is its impulse response?
- Determine whether the following signals are energy-type or power-type, and find the corresponding energy or power in the signal:
 - $x(t) = u(t)$ (the unit step function)
 - $x(t) = 2 \cos(2\pi t) + 3 \cos(4\pi t)$
 - $x(t) = \frac{1}{t}$
- Obtain the Fourier series expansion for the periodic function $x(t) = 2 \cos(2\pi f_0 t) + 3 \cos(4\pi f_0 t)$.
- Find the Fourier series expansion for $x(t) = |\cos(\pi t/2)|$.
- Determine the Fourier transform of the signal $x(t)$ shown below which consists of **three** rectangular pulses. (Note: this is *not* a periodic function.)



- Use the duality property of the Fourier transform to find the Fourier transform of $x(t) = \text{sinc}(Wt)$.