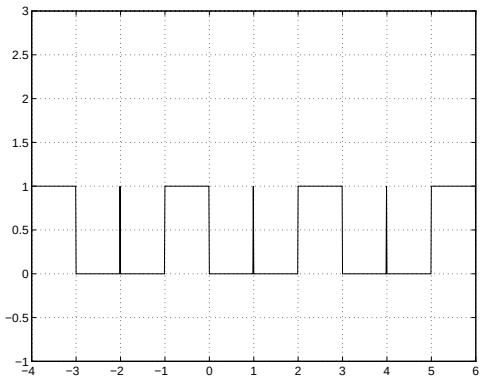
The Johns Hopkins University
Department of Electrical and Computer Engineering

505.460 — Introduction to Linear Systems — Spring 1996

Quiz No. 2.

1. Compute the complex Fourier coefficients C_k for the signal $x(t)$ given below.[25%]



2. Compute the Fourier transform of the signal[20%]

$$x(t) = 3\delta(t-1) + e^{-2(t-1)}u(t-1).$$

3. If $x(t) = \sin^2(3\pi t)$.

   (a) What is the fundamendal period T_0?[10%]

   (b) Compute the coefficients of the Fourier Series:[20%]

$$x(t) = \sum_{k=-\infty}^{\infty} C_k e^{j2\pi kt/T_0}.$$

   Hint: you should be able to do this with little computation.

4. Suppose that the input to a continuous-time, linear time-invariant system is given by:

$$x(t) = 2e^{-3t}u(t)$$

   The output equals

$$y(t) = e^{-t}u(t) - e^{-3t}u(t)$$

5. Find the impulse response of the system $h(t)$. [25%] **Hint.** This problem is much more easily considered in the frequency domain.