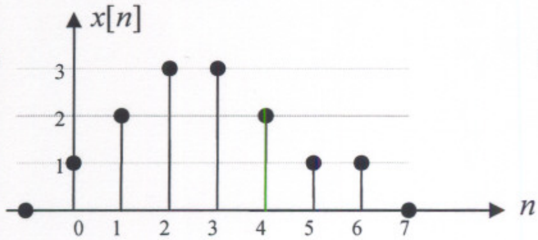
Assignment #2

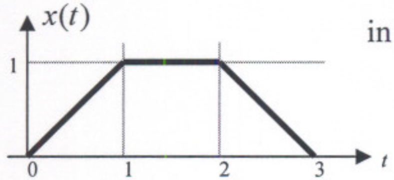
ECSE-2410 Signals & Systems - Fall 2004 Tue 09/07/04

1(20). Given



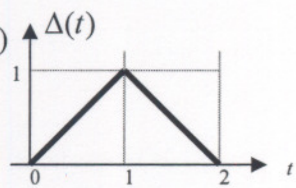
sketch $w[n] = x[-2n+3]$.

2(24). Express $x(t)$,

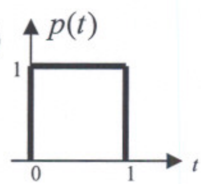


in terms of each of the signals shown below, i.e., in terms of shifted $\Delta(t)$'s for part (a), in terms of shifted $p(t)$'s for part (b), and in terms of step functions for part (c):

(a)



(b)



(c) step functions, $u(t)$.

3(16). Sketch the following signals

(a) $x_1(t) = t(u(t)-u(t-1)) - (t-2)(u(t-1)-u(t-3)) + (t-4)(u(t-3)-u(t-4))$

(b) $x_2(t) = tu(t) - 2(t-1)u(t-1) + 2(t-3)u(t-3) - (t-4)u(t-4)$

Note. If we use the notation, $r(t) = tu(t)$, for a ramp, then it becomes that the equation in (b) is simply a sum of ramps of different slopes and starting times, i.e.,
$x_2(t) = r(t) - 2r(t-1) + 2r(t-3) - r(t-4)$.

4(16). Sketch the derivative, $w(t) = \dfrac{dx(t)}{dt}$, of the following waveforms:

(a) $x(t) = \cos(2\pi t)(u(t) - u(t-\pi))$

(b) $x(t) = u(t) + u(t-1) - 2u(t-2)$

5(24). Evaluate the following integrals and sketch the resulting signals, where

(a) $w_1(t) = \int_{-4}^{4} \delta(\tau - 5)\, d\tau$

(b) $w_2(t) = \int_{-\infty}^{t} [\delta(\tau) - 2\delta(\tau-1) + \delta(\tau-2)]\, d\tau$