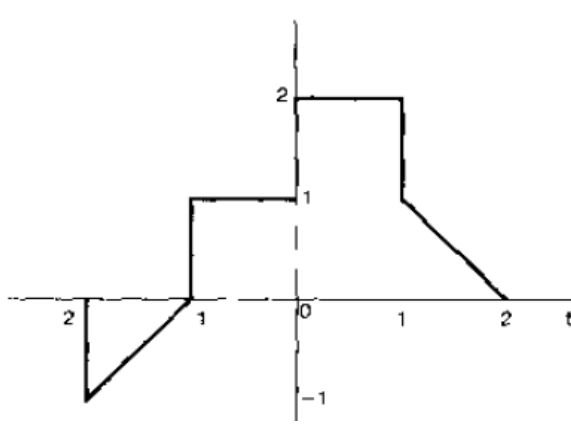
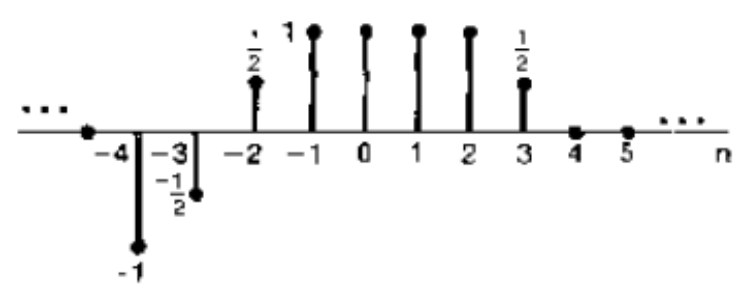


UEC-404 Signals & Systems

Tutorial #4

[1]	<p>A continuous time signal $x(t)$ is shown in Fig.1. Sketch and label carefully each of the following signals:-</p> <p>(a) $x(2t + 1)$ (b) $x(4 - \frac{t}{2})$ (c) $x(t) \left[\delta\left(t + \frac{3}{2}\right) - \delta\left(t - \frac{3}{2}\right) \right]$</p>  <p style="text-align: center;">Fig.1</p>
[2]	<p>A discrete time signal $x[n]$ is shown in Fig.2. Sketch and label carefully each of the following signals:-</p> <p>(a) $x[n - 4]$ (b) $x[n]u[3 - n]$ (c) $x[3n + 1]$</p>  <p style="text-align: center;">Fig.2</p>
[3]	<p>Draw the waveforms of the following signals:</p> <p>(a) $x(t) = r(-3t + 1)$ (b) $y(t) = r(t) - r(t - 1) - r(t - 1) + r(t - 2)$</p> <p>(c) $z(t) = r(t) - r(t - 1) - u(t - 1)$</p> <p>(d) $m(t) = u(t) + r(t) - 2r(t - 1) + r(t - 2) - u(t - 2)$</p> <p>(e) $w(t) = -u(t + 1) + r(t + 1) - r(t - 1) - u(t - 1)$</p> <p>(f) $s(t) = \frac{dw(t)}{dt}$</p>

[4]	<p>Determine whether or not each of the following signals is periodic, also find the period if periodic.</p> <p>(a) $x_1(t) = 2e^{j(t+\frac{\pi}{4})}u(t)$ (b) $x_2[n] = u[n] + u[-n]$</p> <p>(c) $x_3[n] = \sum_{k=-\infty}^{\infty}(\delta[n - 4k] - \delta[n - 1 - 4k])$</p> <p>(d) $x_4(t) = e^{(-1+j)t}$ (e) $x_5(t) = je^{j10t}$ (f) $x_6[n] = 3e^{j3\pi[n+1/2]/5}$</p> <p>(g) $x_7(t) = 2 \cos(10t + 1) - \sin(4t - 1)$</p>
[5]	<p>Determine whether the following signals are power or energy signals or neither</p> <p>(a) $x_1[n] = \left[\frac{1}{2}\right]^n u[n]$ (b) $x_2[n] = e^{j[\pi/2]n+\pi/8}$</p> <p>(c) $x_3(t) = A \sin t, -\infty < t < \infty$ (d) $x_4(t) = A[u(t + a) - u(t - a)], a > 0$</p> <p>(e) $x_5(t) = r(t) = tu(t)$</p>
[6]	<p>Find the even and odd component of the signals :</p> <p>(a) $x_1[n] = u[n]$ (b) $x_2[n] = \{1,2,3,4,5\}$, <i>origin is at sampled value 3.</i></p> <p>(c) $x_3(t) = e^{-2t} \cos t$ (d) $x_4(t) = \begin{cases} Ae^{-\alpha t}, & t > 0 \\ 0, & t < 0 \end{cases}$</p>