Signals & Systems

11/2/2008

Practice Questions

1) Determine whether or not each of the following DT/CT signals is periodic. If the signal is periodic, determine its fundamental frequency.

a) $x(t) = 3\cos(4t + \pi/3)$

b) $x(t) = e^{j(\pi t - 1)}$

c) $x(t) = \{\cos(2t - \pi/3)\}^2$

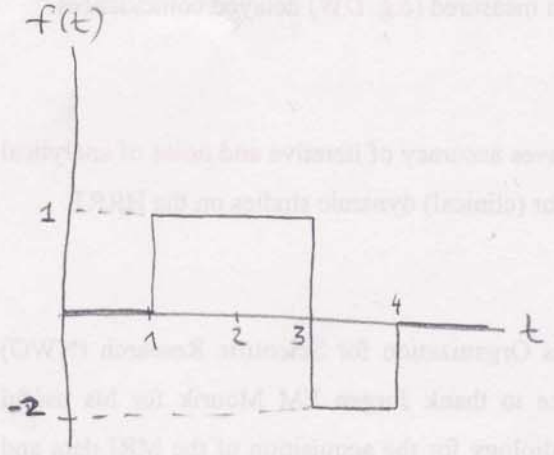
d) $x(t) = \sum_{n=-\infty}^{\infty} e^{-(2t-n)}\, u(2t-n)$

e) $x[n] = \cos\left(\frac{n}{8} - \pi\right)$

f) $x[n] = 2\cos\left(\frac{\pi n}{4}\right) + \sin\left(\frac{\pi}{8}n\right) - 2\cos\left(\frac{\pi}{2}n + \frac{\pi}{6}\right)$

g) $x[n] = \cos\left(\frac{\pi n}{2}\right)\cos\left(\frac{\pi n}{4}\right)$

2)



a) Express $f(t)$ in terms of shifted unit step functions ie.

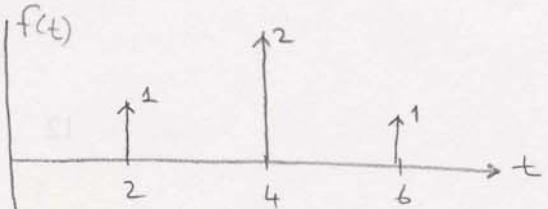
$$f(t) = \sum_{k=0}^{\infty} u(t - t_k)$$

b) Find $\frac{d}{dt} f(t)$ { Express in terms of shifted impulses

c) Find & draw $\int_{-\infty}^{t} f(\tau)\, d\tau$

3) Find even and odd part of unit step, $u(t)$

4)



Find $g(t) = \int_{-\infty}^{t} f(\tau)\, d\tau$