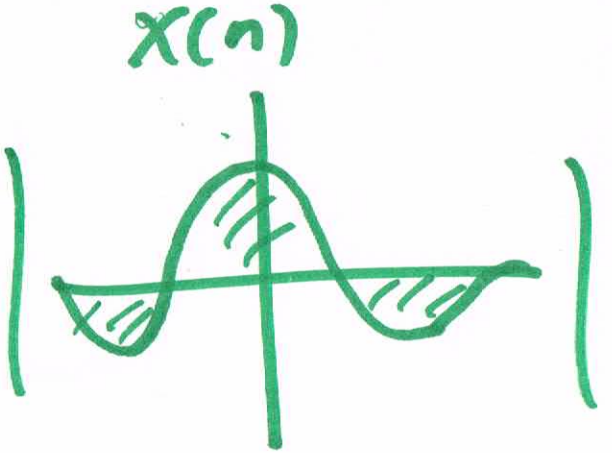
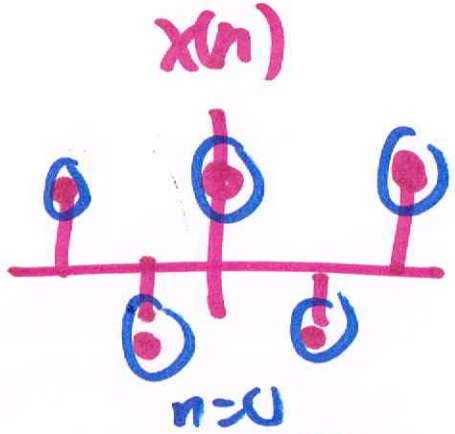
EE360D

Friday, Sept. 3

Review Session



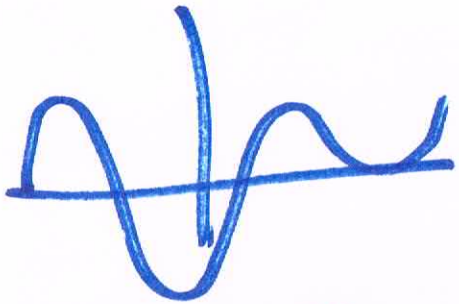


Discrete Power signal:

$$P_x = \lim_{N\to\infty} \frac{1}{2N+1} \sum_{n=-N}^{N} |x(n)|^2$$

is Power if $0 < P_x < \infty$

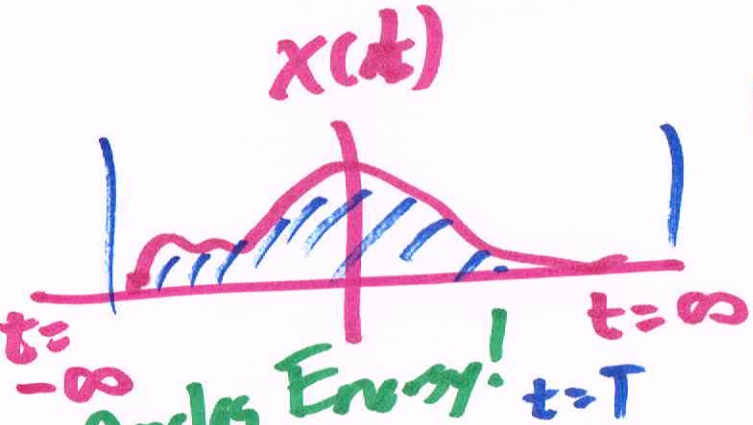
Analog = Cont. Time
Cont. Amp



Power signal

$P_x = \frac{1}{2}$ e sine!

$$\int_{-\pi/2}^{\pi/2} |\sin(t)|\,dt$$

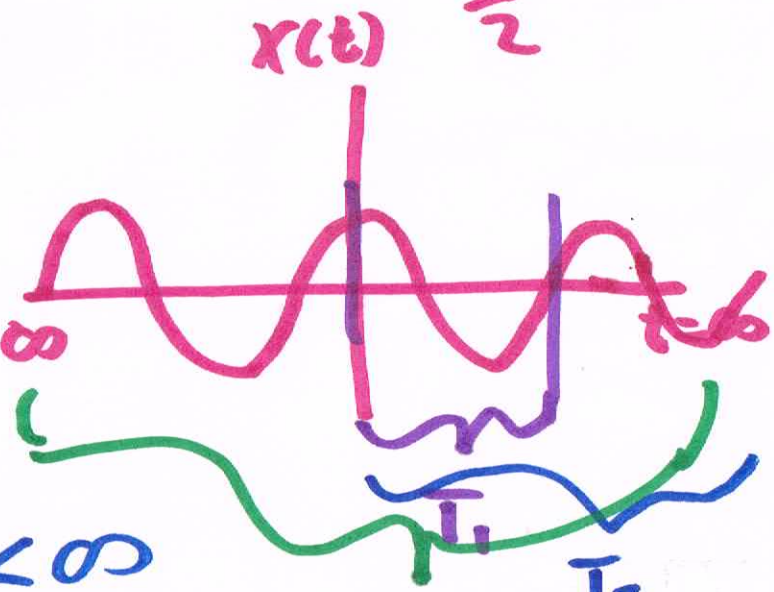


Finite!

Energy Signal!

Analog Energy!

$$E_x = \lim_{T\to\infty} \int_{t=T} |x(t)|^2\,dt$$

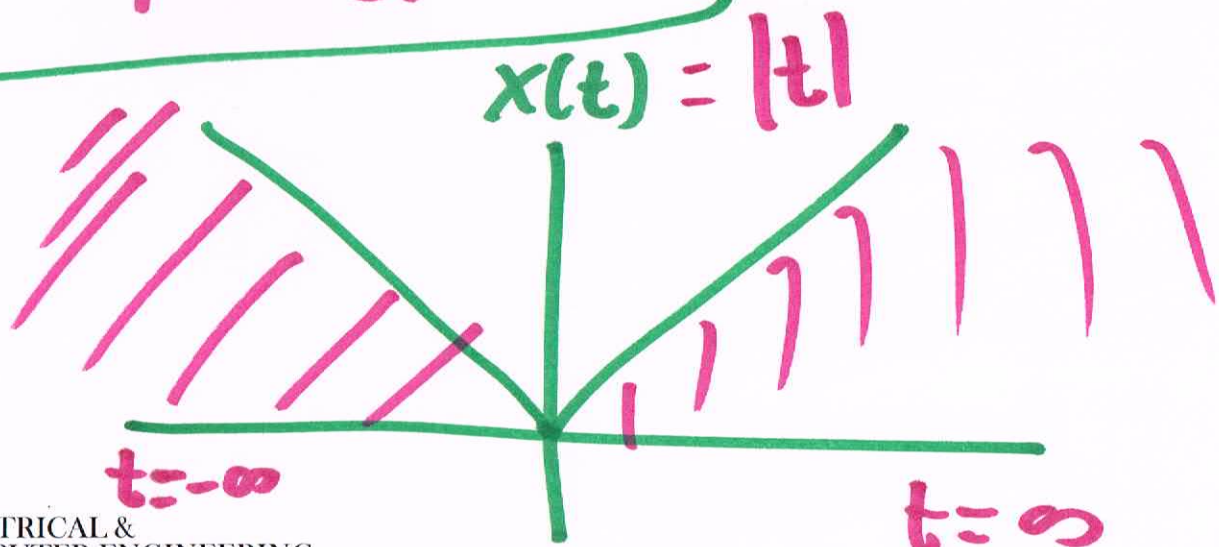


only Energy if $0 < E_x < \infty$

Another Power:

$$P_x = \lim_{T\to\infty} \left(\frac{1}{T}\right) \int_{t=-\frac{T}{2}}^{t=\frac{T}{2}} |x(t)|^2 \, dt = \lim_{T\to\infty} \frac{1}{2T} \int_{t=-T}^{t=T} |x(t)|^2$$

$$\boxed{P_x = \lim_{T\to\infty} \frac{1}{2T} E_x}$$



$$\int_{t=-\infty}^{t=\infty} t\cos(\pi t)\,\frac{d\delta(t-1)}{dt}$$

$$(-1)\,\frac{d}{dt}\Big[t\cos(\pi t)\Big]_{t=1}$$

$$= (-1)\cdot\Big(t\,(-\sin(\pi t)\cdot\pi) + \cos(\pi t)\cdot 1\Big)$$

$$= -1\,\Big(-1\,\sin(\pi)\cdot\pi + \cos(\pi)\cdot\Big)$$

$$= -1\,\Big(0 + (-1)\Big)$$

$$= \boxed{1}$$

$$x(t) = A e^{\alpha t} e^{j\omega t}$$

Amplitude

Inc/decrease

Freq!

zero!

$\alpha = 0$

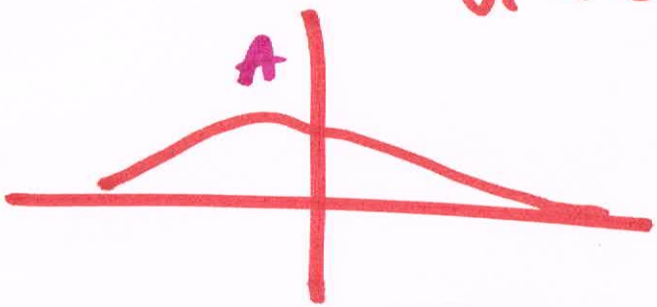
Power!

= Periodic!

Pos! → $\alpha > 0$

Neither!

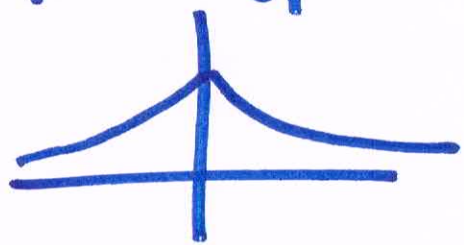
$\alpha < 0$



$Ae^{+t|}$

Energy

Neg! → $\alpha < 0$



$$A\left(e^{j\omega t} + e^{-j\omega t}\right) \qquad \omega = 2\pi f_o$$