EECE 233 Fall 2014 Lec.#17

Announcement

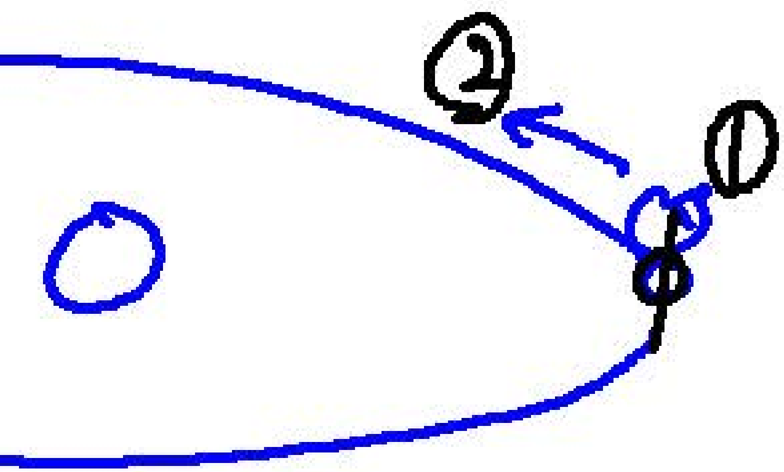
Quiz this Friday!

Problem 9 on midterm #2 will appear!

Review

자전 = rotation

공전 = revolution



자전: ①/②

$\underline{a}, \underline{b} \in \mathbb{C}^{N \times 1}$

$A \in \mathbb{C}^{M \times N}$

$\langle \underline{a}, \underline{b} \rangle \triangleq \underline{a}^H \underline{b}$

$A^H \in \mathbb{C}^{N \times M}$

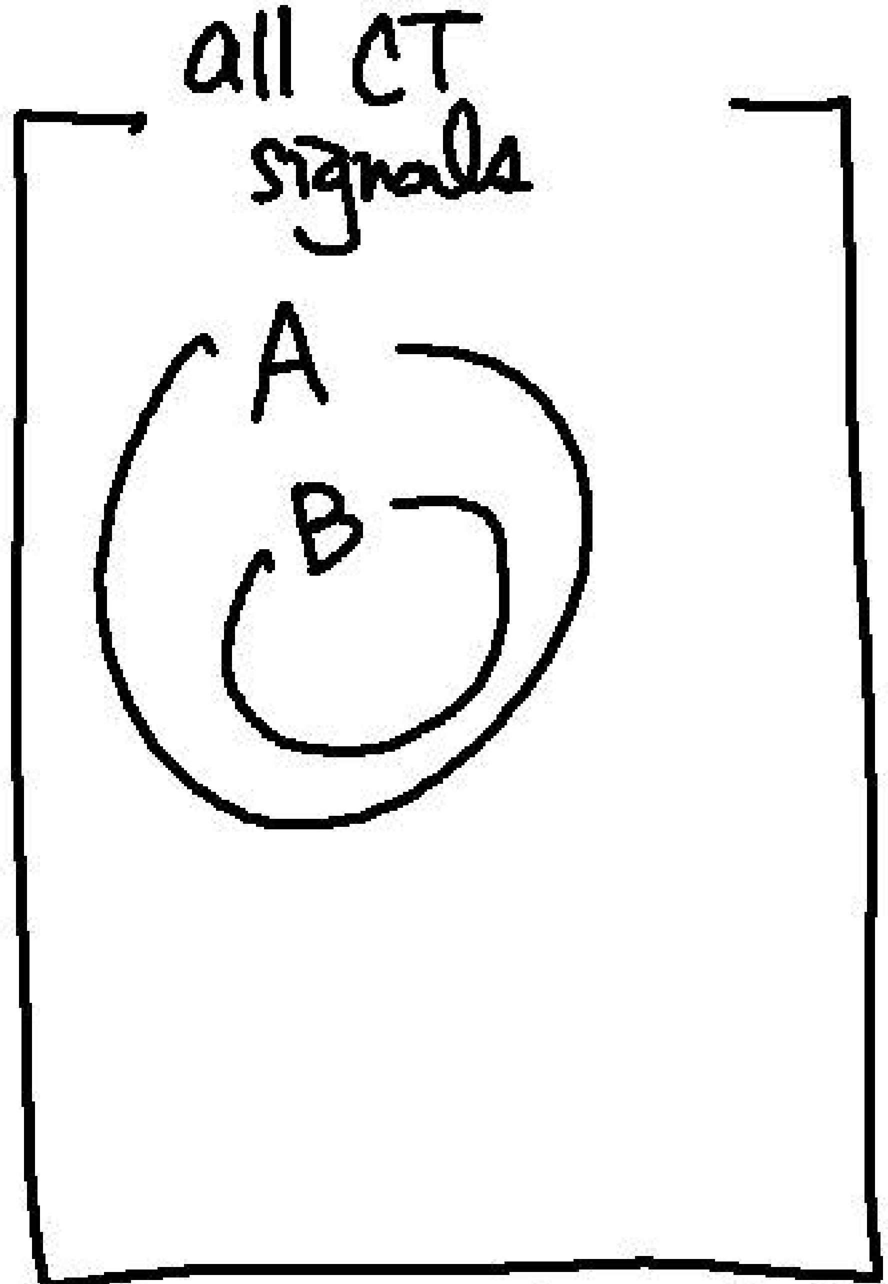
If $N=1$, then $\langle a, b \rangle = a^* b$

$[A^H]_{i,j} = \left([A]_{j,i}\right)^*$

$$\langle a(t), b(t) \rangle \triangleq \int_{-\infty}^{\infty} a^*(t)\, b(t)\, dt$$

$$X(j\omega) \triangleq \frac{1}{2\pi} \langle e^{j\omega t}, x(t) \rangle$$

	impulse response	System function	Frequency Response
CT LTI	$h(t)$	$H(s) =$	$H(j\omega) =$
DT LTI	$h[n]$	$H(z) =$	$H(e^{j\omega}) =$



A : $\{x(t) : X(j\omega) \text{ exists}\}$

$$= \{x(t) : \underbrace{\int_{-\infty}^{\infty} |x(t)|\,dt < \infty}_{\text{absolutely integrable.}}\}$$

B : $\{x(t) : X(j\omega)$ exists &

$$x(t) = \frac{1}{2\pi}\int_{-\infty}^{\infty} X(j\omega)e^{j\omega t}\,d\omega\}$$

$$\left|\int_{-\infty}^{\infty} x(t)e^{-j\omega t}\,dt\right| \le \int_{-\infty}^{\infty} |x(t)e^{-j\omega t}|\,dt = \int_{-\infty}^{\infty} |x(t)|\,dt$$

$C: \{x(t);\ \int_{-\infty}^{\infty} |x(t)|^2 dt < \infty\}$

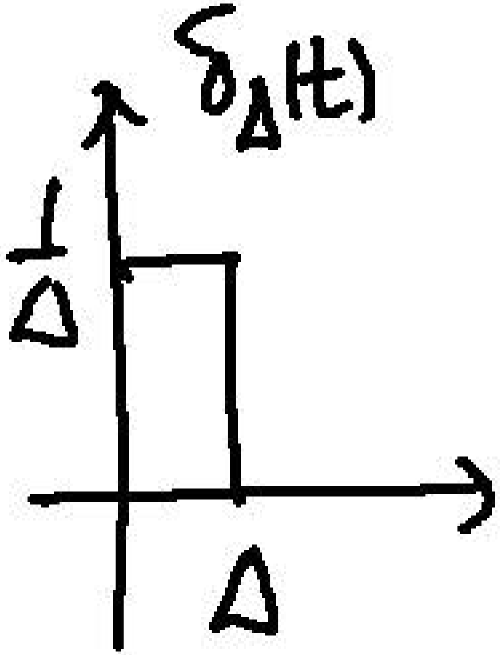
Inverse F-P transform

$= \{x(t);\ X(j\omega)$ exists & $x(t) = \frac{1}{2\pi}\int_{-\infty}^{\infty} X(j\omega)e^{j\omega t} d\omega$

where $=$ is in the l.i.m sense $\}$

Fourier Planchrel TF of $x(t)$

Q. $\int_{-\infty}^{\infty}|\delta(t)|^2 dt < \infty$ T/F



$$\int_{-\infty}^{\infty}|\delta_\Delta(t)|^2 dt$$

$$= \int_0^\Delta \left(\frac{1}{\Delta}\right)^2 dt = \Delta\cdot\left(\frac{1}{\Delta}\right)^2 = \frac{1}{\Delta} \to \infty.$$

as $\Delta \to 0$

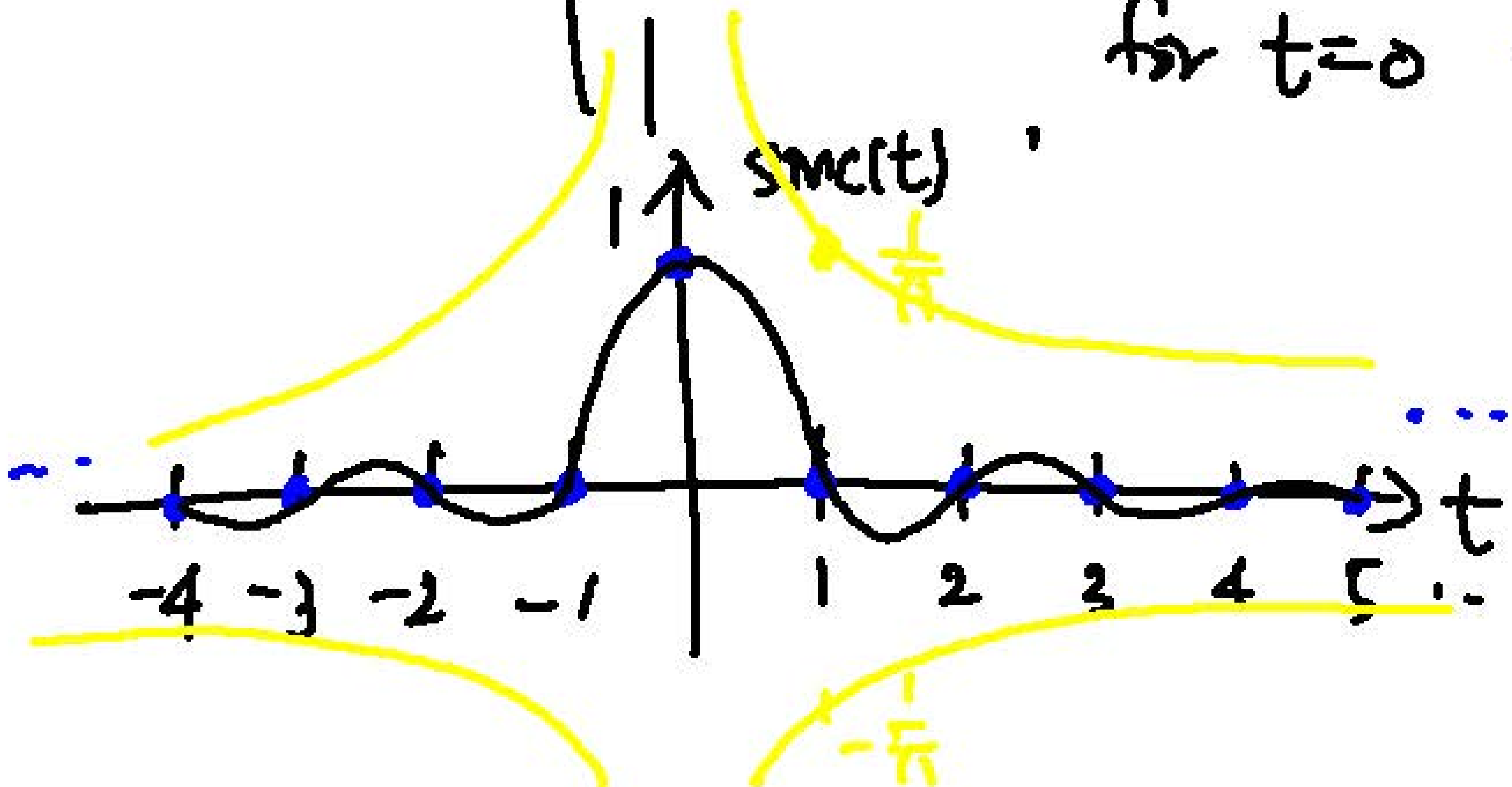
맞습니다~

$$\delta(t-t_0) = \frac{1}{2\pi}\int_{-\infty}^{\infty} e^{j\omega(t-t_0)} d\omega.$$

$$\mathrm{sinc}(t) \triangleq \begin{cases} \dfrac{\sin(\pi t)}{\pi t}, & \text{for } t \neq 0 \\ 1, & \text{for } t = 0 \end{cases}$$

"싱크"

$$\left|\frac{\sin \pi t}{\pi t}\right| \leq \frac{1}{|\pi t|}$$



$$x(0) = \frac{1}{2\pi}\int_{-\infty}^{\infty} X(j\omega)\,\cancel{e^{j\omega t}}\,d\omega$$

$t = 0.$