EECE 233 Fall 2016 Lec. # 18

Announcement

Quiz, MATLAB this Friday.

Supplemental lecture : "

1. 9:30 - 10:45

2. 15:30 - 16:30 ←

# Review


$$Y(j\omega) = X(j\omega)H(j\omega)$$

$$y(t) = x(t) * h(t)$$

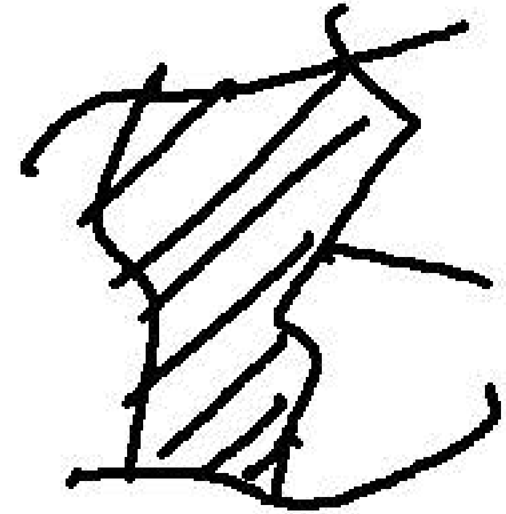
$$x(t) = \frac{1}{2\pi}\int_{-\infty}^{\infty} X(j\omega)\, \boxed{e^{j\omega t}}\, d\omega$$

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

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

$$x(t) \rightarrow \boxed{h(t)} \rightarrow y(t)$$

$$X(j\omega) \rightarrow \boxed{H(j\omega)} \rightarrow Y(j\omega) = X(j\omega)\,H(j\omega).$$



$$\delta(t) \rightarrow \boxed{h(t)} \rightarrow h(t)$$

$$\delta(t) \xleftrightarrow{FT} 1,\ \forall\omega$$

$$\delta(t-t_0)$$

$$h(t-t_0) \xleftrightarrow{FT} H(j\omega)\,e^{-j\omega t_0}$$

$$\Delta(j\omega) \rightarrow \boxed{H(j\omega)} \rightarrow H(j\omega)$$

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

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

- Analysis eq. $X(j\omega)=\int_{-\infty}^{\infty}x(t)e^{-j\omega t}\,dt$

$$X(0)=\int_{-\infty}^{\infty}x(t)\,dt$$

duality
쌍대성

$$\begin{cases} f_X(x)=\frac{1}{\sqrt{2\pi\sigma^2}}\exp\left(-\frac{(x-\mu)^2}{2\sigma^2}\right) \\ \Phi_X(\omega)=\exp\left(j\omega\mu-\frac{\sigma^2\omega^2}{2}\right) \end{cases}$$

← CLT (central limit theorem)

Q. $x(t) \longleftrightarrow X(j\omega)$

Find CTFT of $x(-t)$.

$(ab)^* = a^* b^*$

$\int_{-\infty}^{\infty} x(-t) e^{-j\omega t} dt$

$= \int_{+\infty}^{-\infty} x(t') e^{j\omega t'} (-dt')$ $= X(j\omega)$

$X(j\omega) = \int_{-\infty}^{\infty} x(t) e^{-j\omega t} dt$

$X^*(j\omega) = \left( \int_{-\infty}^{\infty} x(t) e^{-j\omega t} dt \right)^* = \int_{-\infty}^{\infty} \left( x(t) e^{-j\omega t} \right)^* dt$

$= \int_{-\infty}^{\infty} x(t) e^{j\omega t} dt = X(j(-\omega))$