EECE 233 Fall 2014 Lec. #24

Announcements

1. T/F
2. Answer the ...
3. (1 point) x 9

$$\int_{-\Delta\Omega}^{\Delta\Omega} e^{j\omega t}\, d\omega \,, \qquad \sum_{k=-N}^{N} e^{j\omega_0 k t} \quad \ldots$$

4. ? filtering.
5. CTFT
6. DTFT ←
7. LT
8. Characteristic function

simplify : Euler's identity
generalized fts.

visualize :

Review

$x(t)$

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

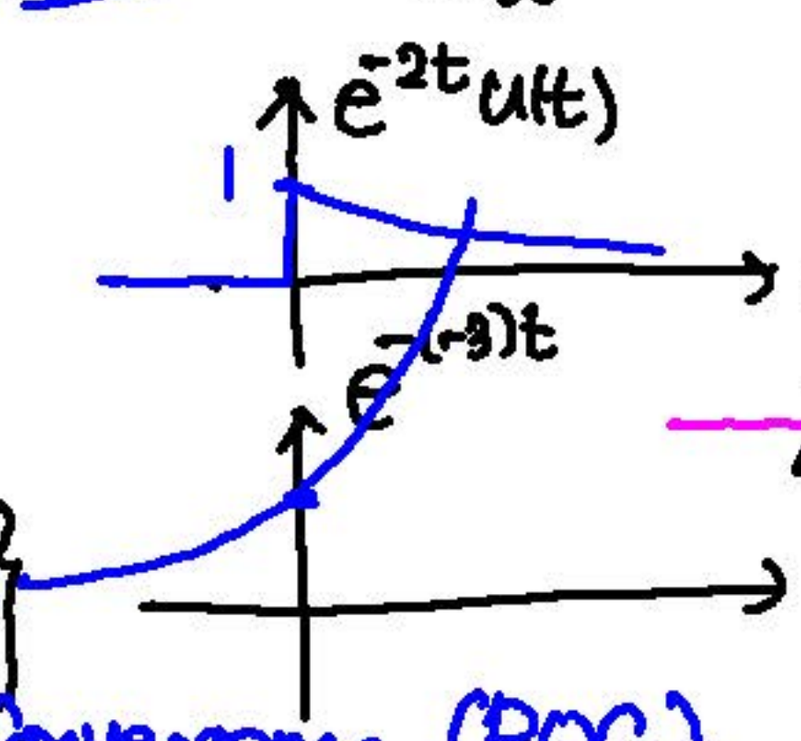
$$X(s) \triangleq \int_{-\infty}^{\infty} x(t) e^{-st} dt$$

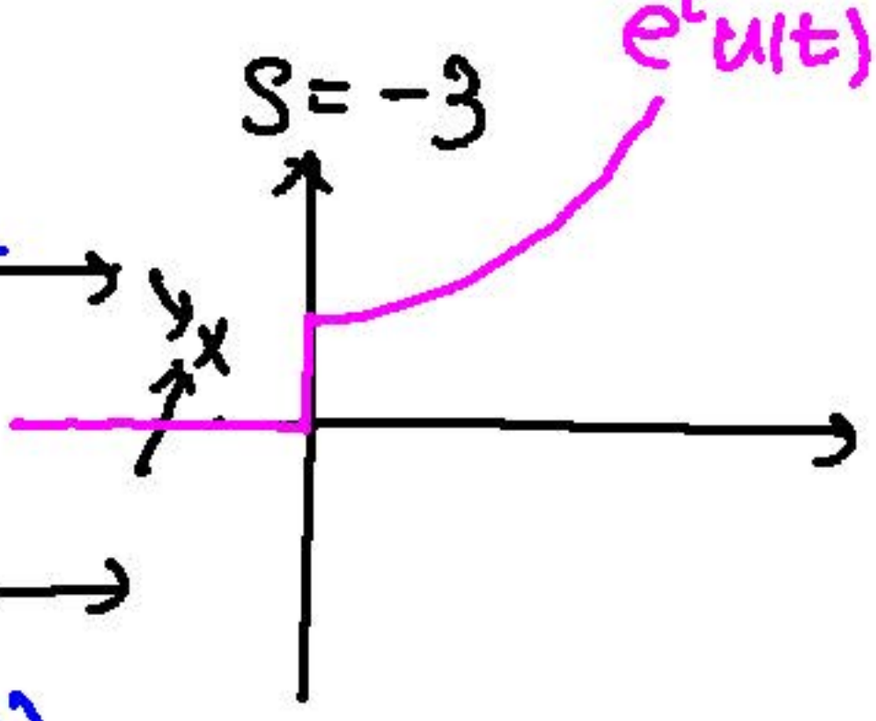
$$X(s) = \frac{1}{s+1}$$

$\{s \in \mathbb{C} :$

$\mathcal{L}\{x(t)\}$ exists$\}$

Region Of Convergence (ROC)



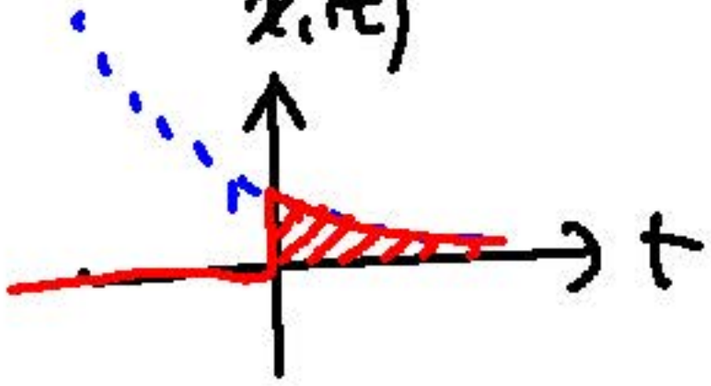


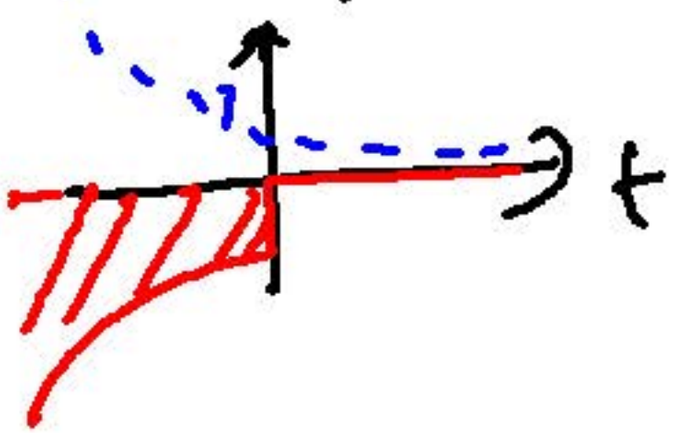
$x_1(t) = e^{-t}u(t)$

$x_2(t) = -e^{-t}u(-t)$

Comparison

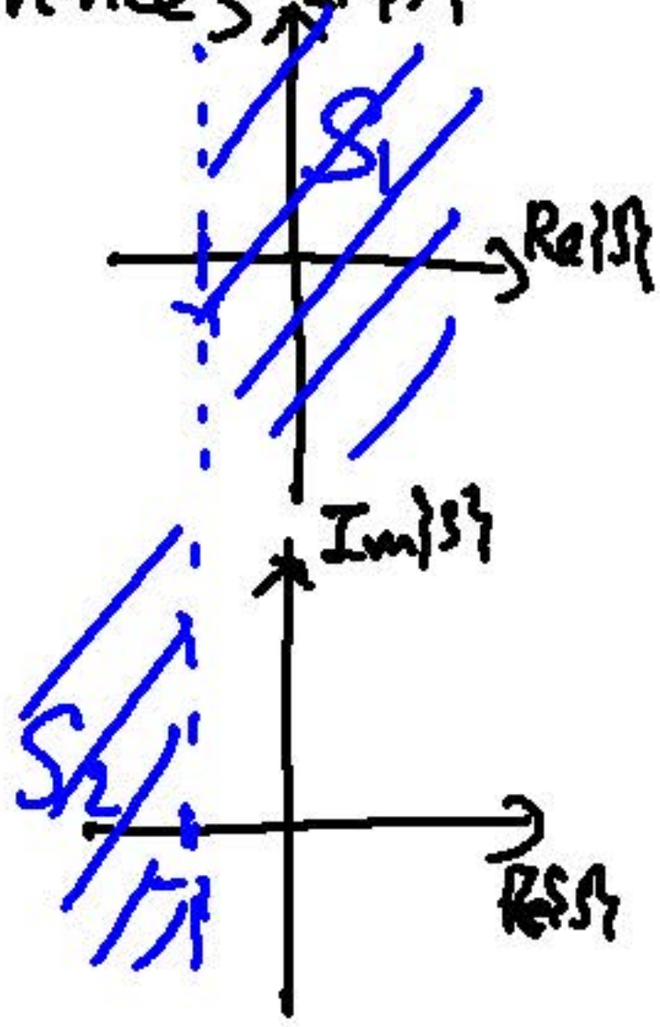
- commonalities
- differences





$$X_1(s) = \frac{1}{s+1}$$

$$X_2(s) = \frac{1}{s+1}$$



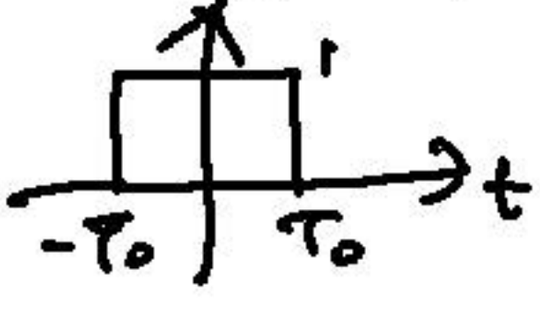
Q. "X(s) is always a rational function of s."

T/F

A. Counter example.

Q. Given $\frac{1}{3}$, write the denominator. | $\frac{N}{D}$.

Q. $x(t)$ 의 Laplace TF 를 구하시오.



T/F.

A. $$\int_{-\infty}^{\infty} x(t) e^{-st}\,dt = \int_{-T_0}^{T_0} e^{-st}\,dt = -\frac{1}{s} e^{-st}\Big|_{-T_0}^{T_0}$$

$$= -\frac{1}{s}\left(e^{-sT_0} - e^{+sT_0}\right) = \frac{e^{sT_0} - e^{-sT_0}}{s}$$

$$e^{x} = 1 + x + \frac{x^2}{2} + \frac{x^3}{6} + \cdots = \sum_{k=0}^{\infty} \frac{x^k}{k!}$$

$$e^{sT_0} = \sum_{k=0}^{\infty} \frac{(sT_0)^k}{k!}$$

$$-e^{-sT_0} = -\sum_{k=0}^{\infty} \frac{(-sT_0)^k}{k!}$$

Not rational.