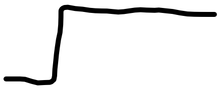
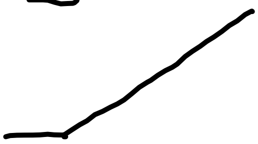
CPE381 #10

LAPLACE

$\delta(t)$ — 1



$u(t)$ — $\frac{1}{s}$

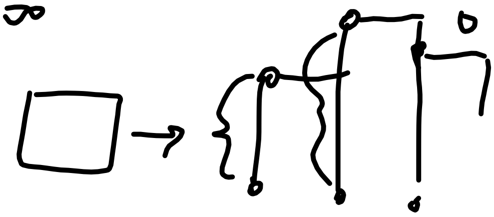


$r(t)$ — $\frac{1}{s^2}$

$$F(s)=\int_{-\infty}^{\infty} f(t)\cdot e^{-st}\,dt$$

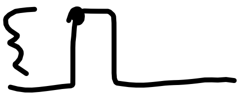
$$\int_{-\infty}^{\infty}\delta(t)e^{-st}\,dt=\int_{0-}^{0+}\delta(t)\underbrace{e^{-s\cdot 0}}_{1}\,dt = 1\cdot\int\delta(t)\,dt=1$$

$$\int_{-\infty}^{\infty}u(t)e^{-st}\,dt=\int_{0}^{\infty}1\cdot e^{-st}\,dt=\frac{1}{-s}e^{-st}\Big|_{0}^{\infty}=\frac{1}{s}$$

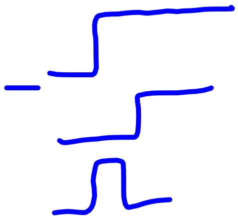


$\underset{1}{\delta(t)}\cdot f(t)$

$f(t)\{$



$f(t)\cdot$



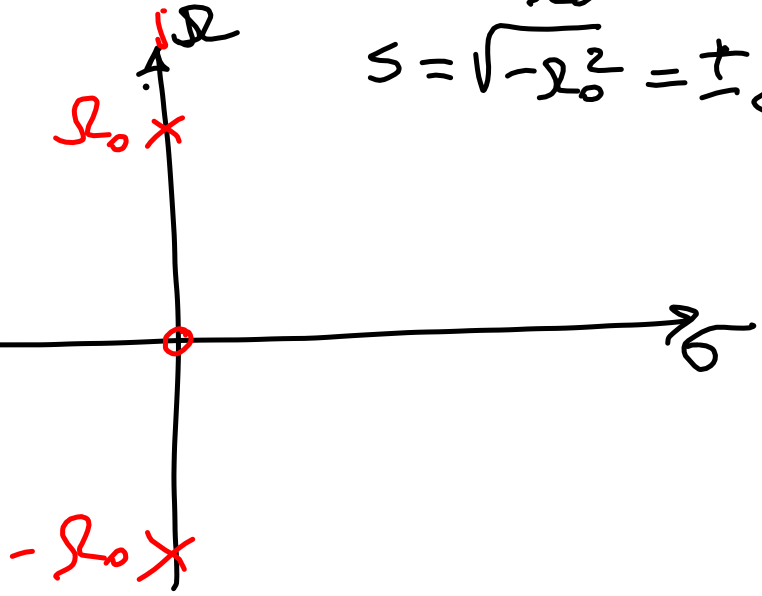
$$\frac{s}{s^2+\Omega_0^2}$$

ZERO: $s = \emptyset$

POLES: $s^2+\Omega_0^2=\emptyset$

$$s^2 = -\Omega_0^2$$

$$s = \sqrt{-\Omega_0^2} = \pm j\Omega_0$$



$$s^2+2s+4 = 1\cdot s^2 + 2\cdot s + 4\cdot s^0$$

root([1 2 4])

$e^{-at}u(t)$

$\Updownarrow$

$\mathcal{L}(\quad) = \frac{1}{s+a}$