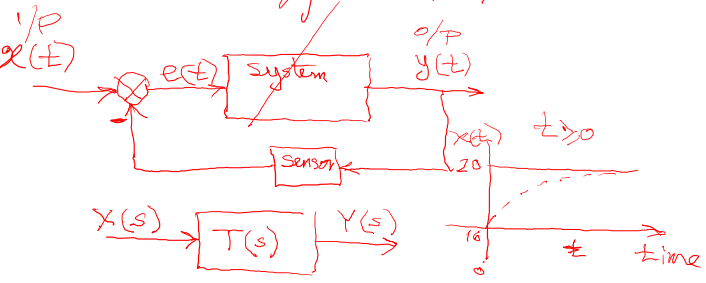


dynamical  $\Rightarrow$  D.E



$f(t) = x(t) = \text{step-Function} = A$  — (1)  
 $= \text{Unit step Function} = 1$  — (2)

$F(s) = X(s) = \int_0^{\infty} f(t) e^{-st} dt$

$f(t) = \text{Impulse Function} = \delta(t)$

$f(t) = \text{Ramp Function} = t$

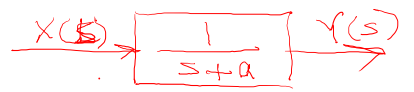
$f(t) = e^{-at}$

$f(t) = \cos(\omega t)$

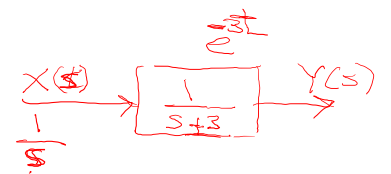
$\frac{d e^{-st}}{dt} = -s e^{-st}$   
 $-\frac{d e^{-st}}{dt} = -s e^{-st}$

$\int_0^{\infty} e^{-st} dt = \left[ \frac{e^{-st}}{-s} \right]_0^{\infty} = \frac{1}{s}$

$\mathcal{L}[1] = \frac{1}{s}$



$Y(s) = \frac{1}{s+a} \cdot X(s)$   
 $\frac{Y(s)}{X(s)} = \frac{1}{s+a}$  [Transfer Function]



$Y(s) = \frac{1}{s(s+3)}$   
 $\mathcal{L}^{-1} Y(s) = y(t) = \mathcal{L}^{-1} \frac{1}{s(s+3)}$   
 $y(t) = 1 - e^{-3t}$

