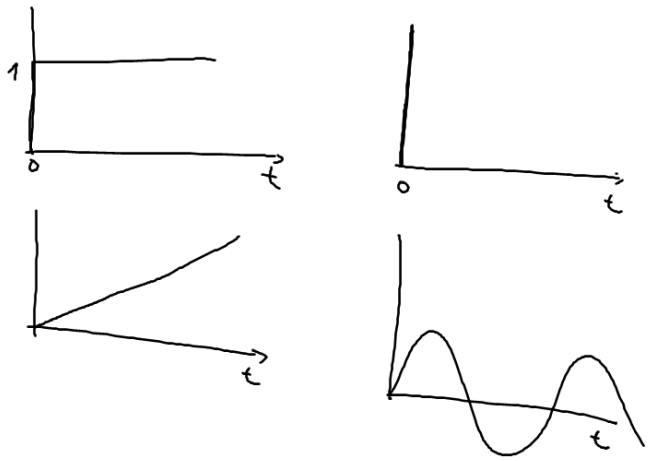


$$G(s) = \frac{Y(s)}{U(s)} = \frac{B(s)}{A(s)} = \frac{(s-z_1)(s-z_2)\cdots}{(s-p_1)(s-p_2)\cdots}$$

$$A(s) \cdot Y(s) = B(s) \cdot U(s)$$

$$U(s) = 0 \Rightarrow A(s) \cdot Y(s) = 0$$

$$G(s) = \frac{1 \cdot s}{s+1} \qquad (s+1) \cdot Y(s) = \textcircled{s} \cdot U(s)$$

$$= s \cdot \frac{1}{s}$$

$U(s) = \frac{1}{s}$

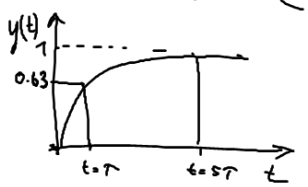
$$Y(s) = G(s) \cdot U(s) = \frac{1}{\tau s+1} \cdot \frac{1}{s} = \frac{k_1}{s} + \frac{k_2}{\tau s+1}$$

$s = -\frac{1}{\tau}$

$$= \frac{1}{s} + \frac{-\tau}{\tau s+1} \rightarrow \frac{-1}{s+\frac{1}{\tau}}$$

$$\frac{1}{s+a} \leftrightarrow e^{-at}$$

$$y(t) = 1 - e^{-\frac{t}{\tau}}$$

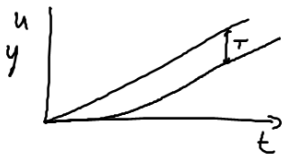


$t = \tau \Rightarrow y(\tau) = 1 - e^{-1}$

$$\frac{1}{s} = \frac{Y(s)}{U(s)} \Rightarrow s\,Y(s) = U(s)$$

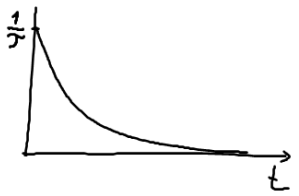
$$\dot{y}(t) = u(t)$$

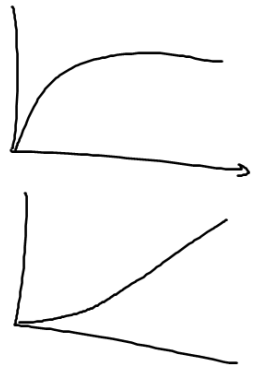
$$y(t) = \int u(t)\,dt$$



$$\frac{1}{s^2} \qquad \frac{1}{Ts+1} \cdot \frac{1}{s^2}$$

$$\boxed{\frac{1}{(Ts+1)s}} \cdot \frac{1}{s}$$

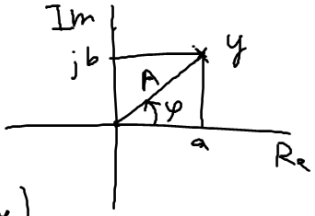




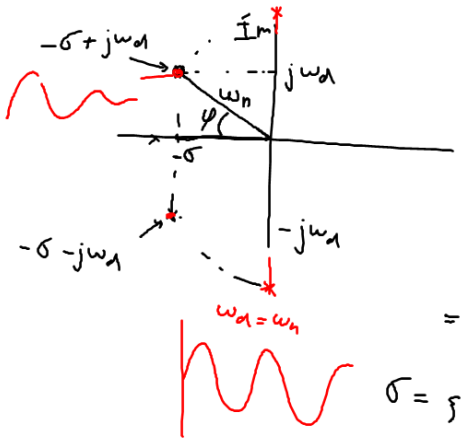
$$y = a + jb$$

$$\boxed{y = A\, e^{j\varphi}}$$

$$y = A(\cos\varphi + j\sin\varphi)$$



$$a = A\cos\varphi$$
$$b = A\sin\varphi$$



$$\omega_n^2 = \sigma^2 + \omega_d^2$$

$$s^2 + 2\zeta\omega_n s + \omega_n^2$$

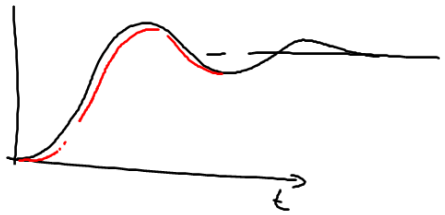
$$\underbrace{(s+\sigma)}_{a} + \underbrace{j\omega_d}_{b} \cdot (s+\sigma-j\omega_d)$$

$$(s+\sigma)^2 + \omega_d^2$$

$$= s^2 + 2\sigma s + \underbrace{\sigma^2 + \omega_d^2}_{\omega_n^2}$$

$$\sigma = \zeta\omega_n$$

$$\sigma = \underbrace{\cos\varphi}_{\zeta} \cdot \omega_n$$



$$\frac{\omega_n^2}{s^2+2\zeta\omega_n+\omega_n^2} \qquad \frac{1}{s+10\omega_n}$$