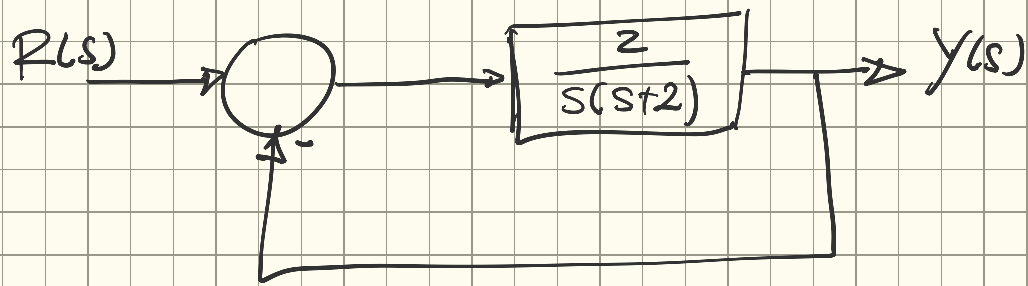
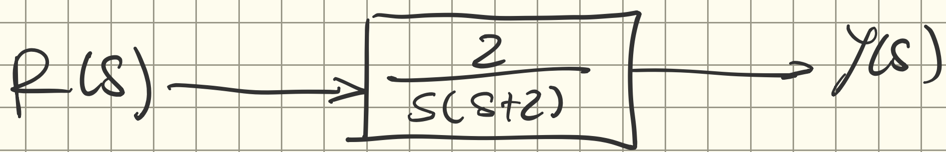


en lazo abierto:



$$Y(s) = \frac{2}{s(s+2)} R(s)$$

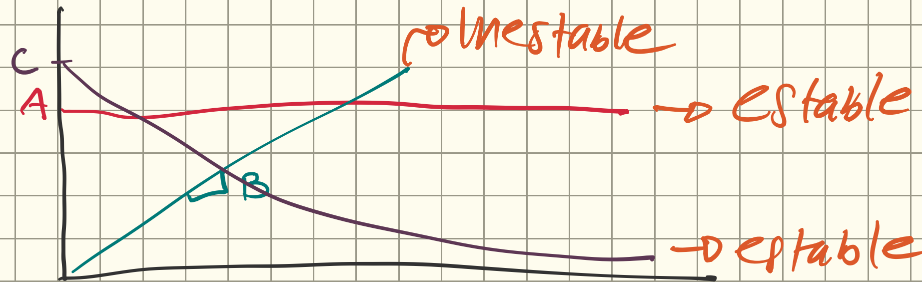
Si $R(s) = \frac{1}{s}$ (escalón unitario)

$$Y(s) = \frac{2}{s^2(s+2)} = \frac{A}{s} + \frac{B}{s^2} + \frac{C}{s+2}$$

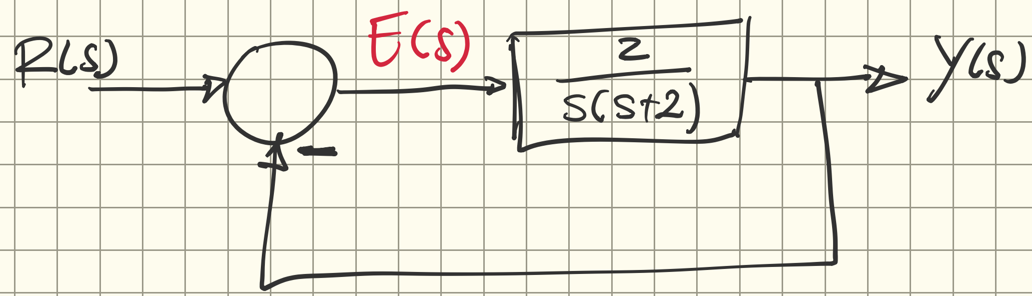
$\frac{A}{s} \rightarrow A\,u(t)$

$\frac{B}{s^2} \rightarrow B\,t\,u(t)$

$\frac{C}{s+2} \rightarrow C e^{-2t} u(t)$



en lazo cerrado:



$$Y(s) = \frac{2}{s(s+2)} E(s)$$

$$E(s) = R(s) - Y(s)$$

$$Y(s) = \frac{2}{s(s+2)} \left[R(s) - Y(s) \right]$$

$$Y(s) = \frac{2}{s(s+2)} R(s) - \frac{2}{s(s+2)} Y(s)$$

$$Y(s) + \frac{2}{s(s+2)} Y(s) = \frac{2}{s(s+2)} R(s)$$

$$\left[1 + \frac{2}{s(s+2)} \right] Y(s) = \frac{2}{s(s+2)} R(s)$$

$$Y(s) = \frac{\frac{2}{s(s+2)}}{1 + \frac{2}{s(s+2)}} R(s)$$

$$y(s) = \frac{2}{s(s+2)+2} R(s)$$

$$y(s) = \frac{2}{s^2+2s+2} R(s)$$

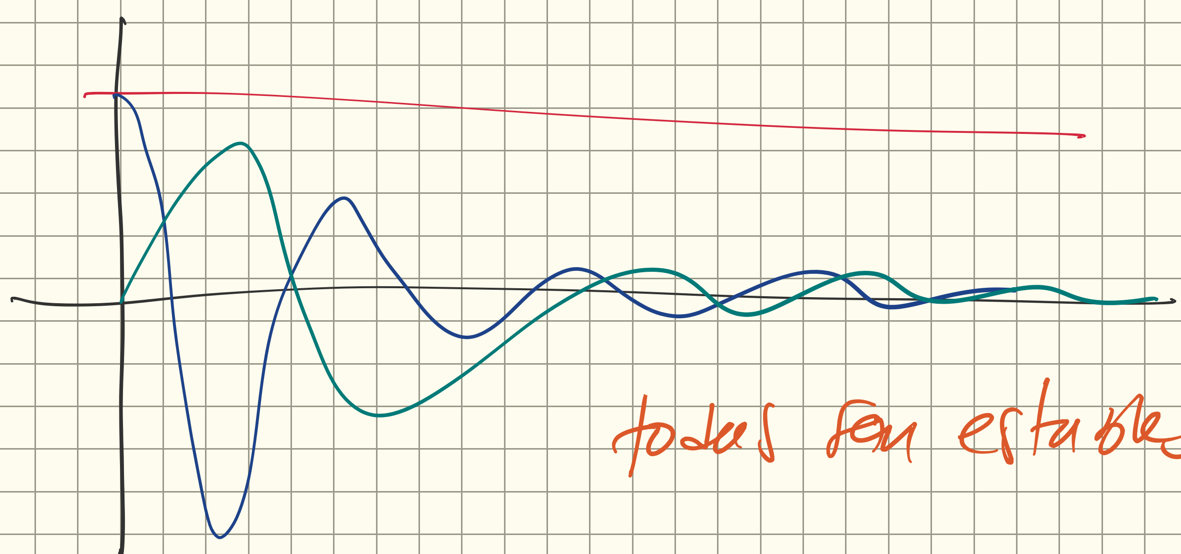
Si $R(s) = \frac{1}{s}$

$$y(s) = \frac{2}{s(s^2+2s+2)} = \frac{A}{s} + \frac{Cs+D}{s^2+2s+2}$$

$$y(s) = \frac{A}{s} + \frac{Cs+D}{(s+1)^2+1}$$

$A u(t)$

$C e^{-t} \cos(t) u(t) + (D-C) e^{-t} \operatorname{sen}(t) u(t)$



todas son estables.