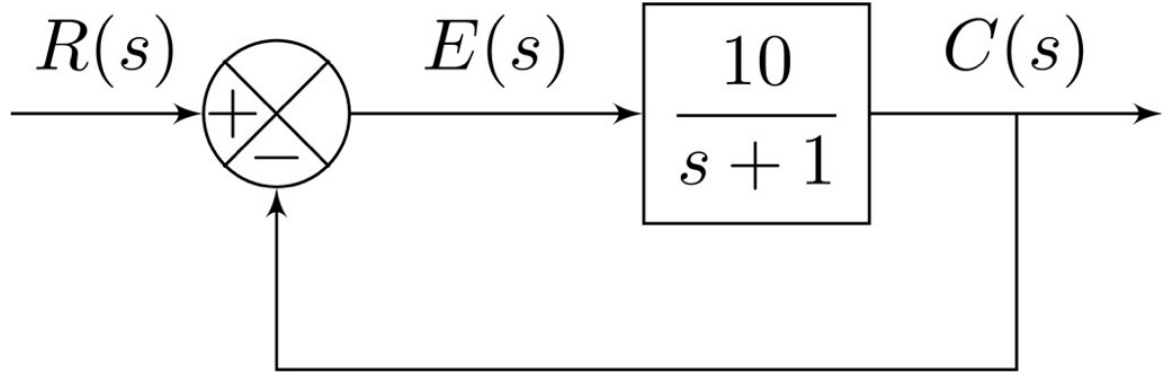
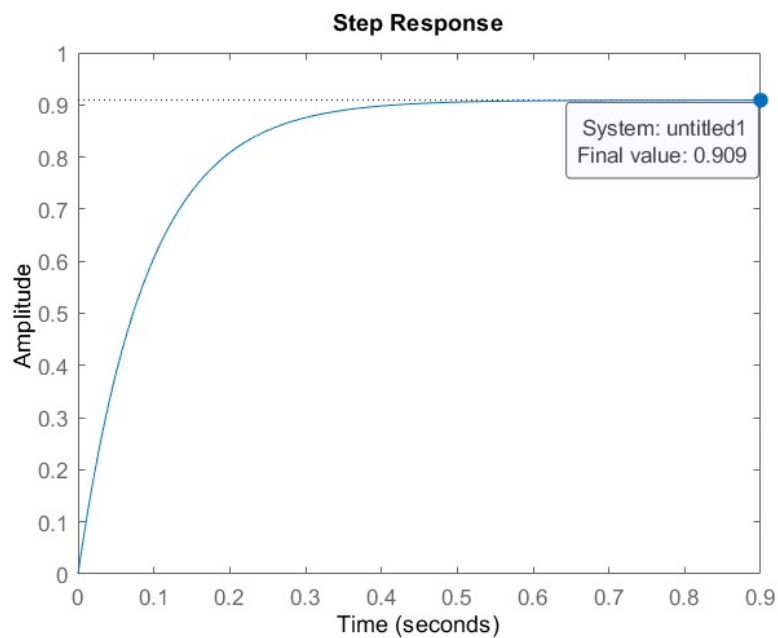


# Ejemplo 1

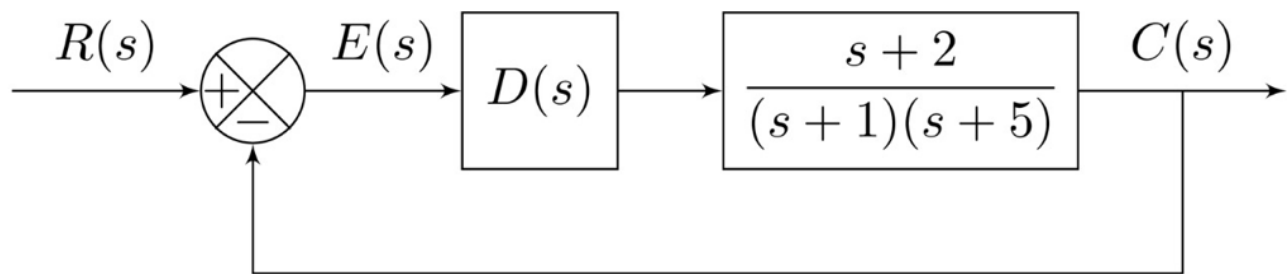


$$e_{ss} = \lim_{s \rightarrow 0} \frac{s R(s)}{1 + \frac{10}{s+1}}$$
$$= \lim_{s \rightarrow 0} \frac{s \cdot \frac{1}{s}}{1 + \frac{10}{s+1}}$$

$$e_{ss} = \frac{1}{11}$$



## Ejemplo 2



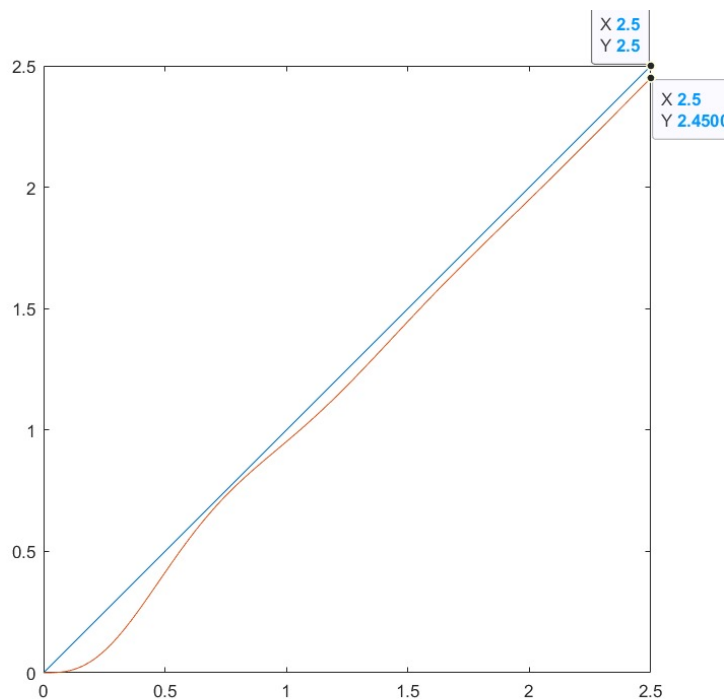
Como se pide error finito ante la rampa, el sistema debe ser tipo 1, entonces  $D(s) = \frac{k}{s}$

$$e_{ss} = \frac{1}{k_v} = 0.05 \Rightarrow k_v = 20$$

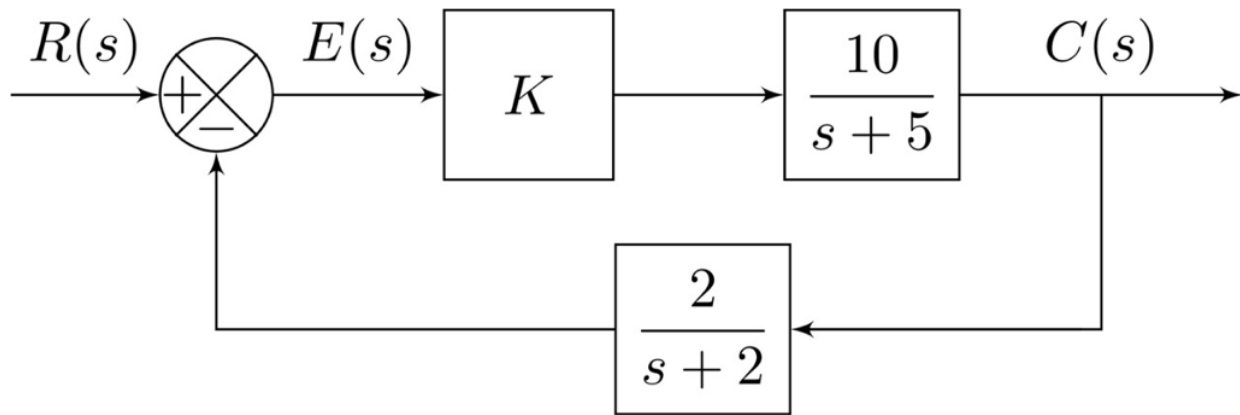
$$k_v = \lim_{s \rightarrow 0} s G(s) = \lim_{s \rightarrow 0} s \left( \frac{k}{s} \right) \left( \frac{s+2}{(s+1)(s+5)} \right)$$

$$= \frac{2k}{5}$$

$$k = 50$$



### Ejemplo 3



Como el sistema no tiene realimentación unitaria, se debe transformar

$$G(s) = \frac{10K}{s+5}$$

$$H(s) = \frac{2}{s+2}$$

$$\bar{G}(s) = \frac{G(s)}{1 + G(s)[H(s) - 1]}$$

$$= \frac{\frac{10K}{s+5}}{1 + \left(\frac{10K}{s+5}\right)\left(\frac{2}{s+2} - 1\right)}$$

$$= \frac{\frac{10K}{s+5}}{1 + \left(\frac{10K}{s+5}\right)\left(\frac{\cancel{2} - (s+2)}{s+2}\right)}$$

$$= \frac{\frac{10K}{s+5}}{1 - \frac{10Ks}{(s+5)(s+2)}}$$

$$\bar{U}(s) = \frac{10K(s+2)}{(s+5)(s+2) - 10KS}$$

$$\bar{U}(s) = \frac{10K(s+2)}{s^2 + (7-10K)s + 10}$$

Se pide error finito ante el es calón, por lo que

$$e_{ss} = \frac{1}{1+K_p} = 0.02 \Rightarrow K_p = 49$$

$$K_p = \lim_{s \rightarrow 0} \bar{U}(s)$$

$$\lim_{s \rightarrow 0} \frac{10K(s+2)}{s^2 + (7-10K)s + 10} = \frac{20K}{10} = 49$$

$$K = \frac{490}{20}$$

$$K = \frac{49}{2}$$

