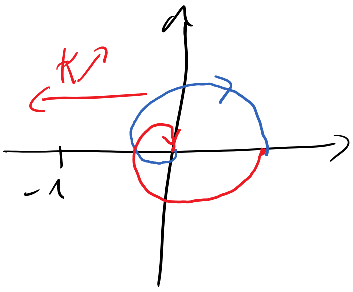
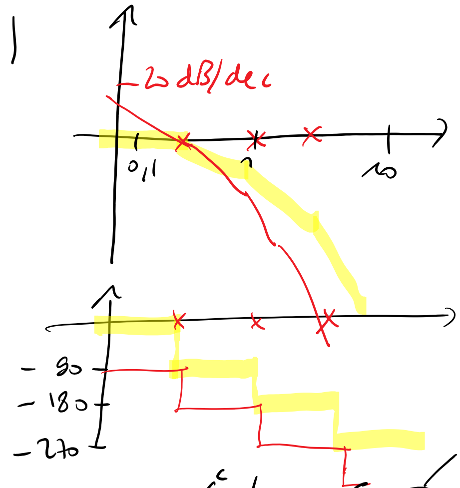
2020.09.11 Automatique - Course 5 - Notes

jeudi 10 septembre 2020 16:02

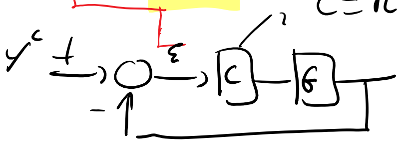
$$KG(p) = \frac{K}{p} \qquad K \frac{1}{p(p+1)(1+0{,}5p)(1+2p)}$$



$|G|$



$C = k$



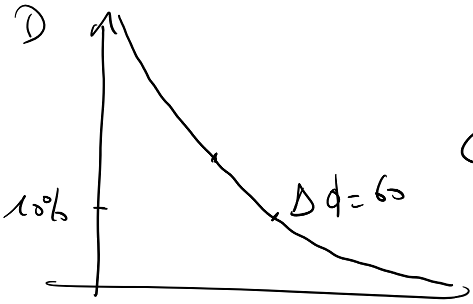
$\varepsilon_\infty < 5\%$

$$\frac{\varepsilon}{y^c} = \frac{1}{1+CG} = \frac{1}{1+kG}$$

$G(0) = 1$

$$\left|\frac{1}{1+k}\right| < 0{,}05 \Rightarrow 0{,}05k > 0{,}95 \Rightarrow k > 19$$

$$\underline{20 \log(k) >} \; 20 \log(19) = \underline{25 \text{ dB}}$$



$$\leftarrow \frac{K}{p(1+Tp)} \quad \Bigg\| \quad \frac{K}{p(1+T_1p)(1+T_2p)(1+T_3p)}$$

$$G(p) = \frac{K}{(1+T_1p)(1+T_2p)}$$

$T_1 \ll T_2$

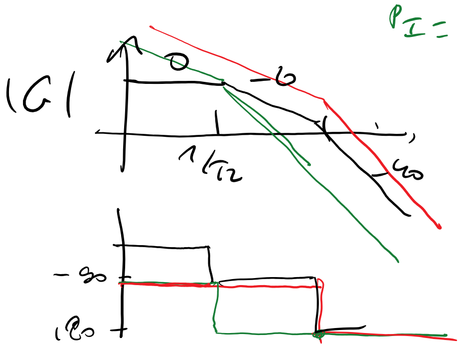
$\boxed{\text{Prop } 1 : \; T_i = T_1}$

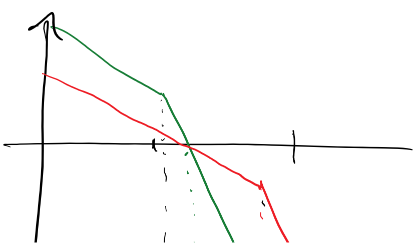
Prop 2 : $T_i = T_2$

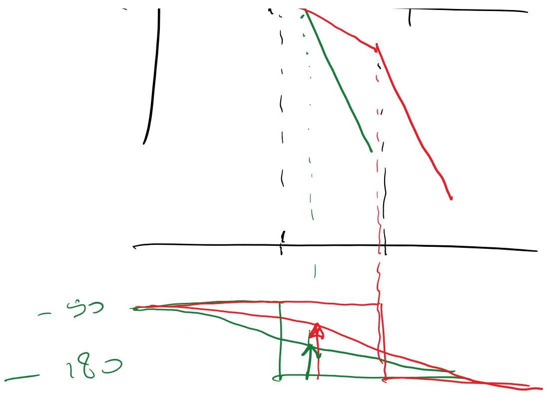
$$PI(p) = k\left(1 + \frac{1}{T_ip}\right) = k\left(\frac{1+T_ip}{T_ip}\right)$$

$$P_I = k\left(\frac{1+T_ip}{T_ip}\right)$$

$|G|$





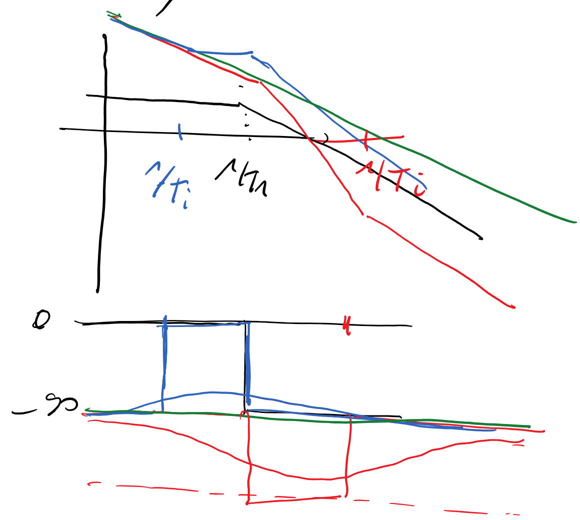


$G(p) = \frac{K}{(1+T_1 p)}$ $\quad PI = k\left(\frac{1+T_i p}{T_i p}\right)$

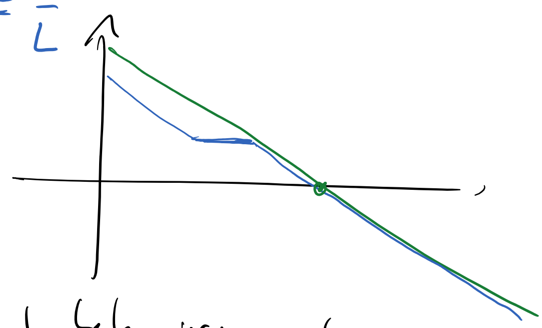
Prop 1: $T_i \ll T_1$

Prop 2: $T_i \gg T_1$

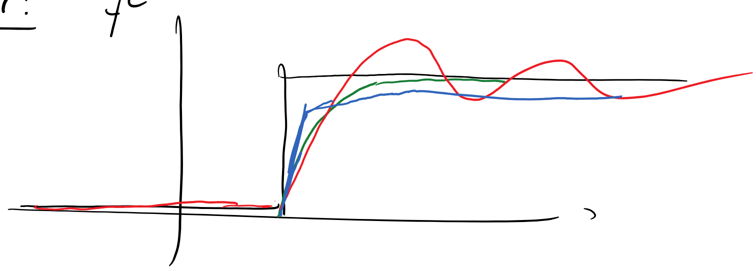
Prop 3: $T_i = T_1$



$\frac{\varepsilon}{y^c} = \frac{1}{1+L} \simeq \frac{1}{L}$



Temporal behavior:



Example.

+ $\boxed{\text{No overshoot}}$
+ No steady-state error → Infinite gain at 0. ↳ Integral → PI
+ Bandwidth $\boxed{\geq 5 \text{ rad/s}}$

$\Delta\phi > 75°$