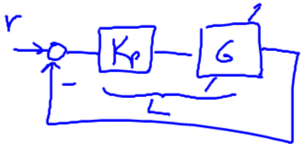
$$k = \frac{K_t}{JR}, \quad a = \frac{bR + K_t^2}{JR}$$

$$k = 50 \qquad a = 35$$

① 

$$1 + K_p \cdot G = 0$$

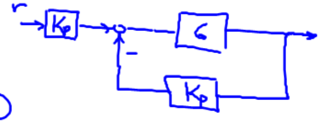
②
$$k = K \cdot \left(\frac{k_t \cdot k_p}{J_n R}\right) = K \cdot k_n$$
$$a = K \cdot \left(\frac{bR + k_t^2}{J_n \cdot R}\right) = K \cdot a_n$$
$$K = \frac{J_n}{J}$$
$$\frac{K_p k}{s(s+a)}$$

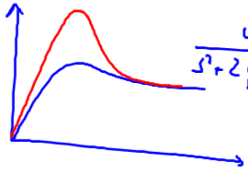
$$1 + \frac{K k_n}{s(s + K a_n)} = 0$$

$$s^2 + K a_n s + K k_n = 0 \Rightarrow 1 + K \frac{a_n s + k_n}{s^2} = 0$$

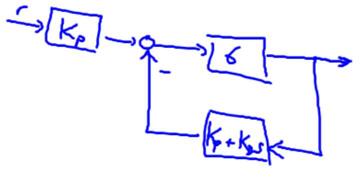
$$u = K_p e = K_p (r - y) = K_p r - K_p y$$

① 





$$\frac{\omega^2}{s^2 + 2\zeta\omega s + \omega^2} \leftarrow \omega^2(s+b)$$

② 

① $$G_c^{(1)}(s) = \frac{G \cdot C}{1 + G \cdot C}$$

② $$G_c^{(2)} = \frac{G \cdot K_p}{1 + G C}$$

$$U(s) = M \frac{\omega}{s^2 + \omega^2}$$

$$Y(s) = G(s) \cdot \frac{M\omega}{(s - j\omega)(s + j\omega)}$$

$$y(t) = \underbrace{\sum_{i=1}^{n} \sum_{j=1}^{m_i} K_{ij} t^j \cdot e^{p_i t}}_{\text{transient}} + \underbrace{\frac{K}{s - j\omega} + \frac{K^*}{s + j\omega}}_{\text{periodiek blijvend}}$$

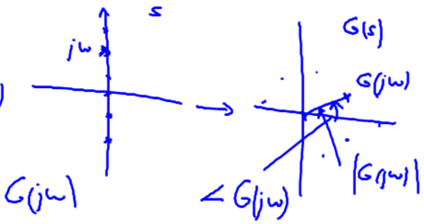
$$G(s) \cdot \frac{M\omega}{(s - j\omega)(s + j\omega)} = \frac{K}{s - j\omega} + \frac{K^*}{s + j\omega} \quad \Big| * (s - j\omega)$$

$$G(s) \frac{M\omega}{s + j\omega} = K + \frac{K^*(s - j\omega)}{s + j\omega} \quad \Big|_{s = j\omega}$$

$$K = G(j\omega) \cdot \frac{M\omega}{2j\omega}$$

$$K = \frac{M}{2j} \cdot |G(j\omega)| \cdot e^{j \angle G(j\omega)}$$

$$K^* = -\frac{M}{2j} |G(j\omega)| \cdot e^{-j \angle G(j\omega)}$$



$$\frac{M}{2j}\left|G(j\omega)\right| \cdot \left(e^{j(\omega t + \angle G(j\omega))} - e^{-j(\omega t + \angle G(j\omega))}\right)$$

$$= M\left|G(j\omega)\right| \cdot \sin\left(\omega t + \angle G(j\omega)\right)$$

$$K = \frac{M}{2j} \cdot \left|G(j\omega)\right| \cdot e^{j\angle G(j\omega)}$$

$$K^* = -\frac{M}{2j}\left|G(j\omega)\right| \cdot e^{-j\angle G(j\omega)}$$