DЛ PCSI/ПASI SLANT

Q1

$$I_2 \dot{q}^2 \theta_{20}(\dot{q}) = -k_v \left(\dot{q}\, \theta_{20}(\dot{q}) - \dot{q}\, \theta_{10}(\dot{q}) \right) - k_r \left(\theta_{20}(\dot{q}) - \theta_{10}(\dot{q}) \right)$$

$$\frac{\theta_{20}(\dot{q})}{\theta_{10}(\dot{q})} = \frac{k_v \, \dot{q} + k_r}{I_2 \, \dot{q}^2 + k_v (\dot{q} + k_r \cdot \frac{k_v}{k_r})}$$

$$= \frac{1 + \frac{k_v}{k_r} \dot{q}}{\frac{I_2}{k_r} \dot{q}^2 + \frac{k_v}{k_r} \dot{q} + 1}$$

$$K = 1 \qquad \omega_0 = \sqrt{\frac{k_r}{I_2}} \qquad \frac{2\xi}{\omega_0} = \frac{k_v}{k_r}$$

$$\Rightarrow \xi = \frac{k_v}{2 k_r} \sqrt{\frac{k_r}{I_2}} = \frac{k_v}{2 \sqrt{k_r I_2}}$$

Q2 $\quad \xi = 0{,}7 \Rightarrow \xi = \frac{\sqrt{2}}{2} = \frac{k_v}{2 \sqrt{k_r I_2}} \Rightarrow k_v = \sqrt{2 k_r I_2}$

Q4 $\quad Q(\dot{q}) = S \, \dot{q} \, \lambda(\dot{q}) + \frac{V_0}{2B} \, \dot{q} \cdot P(\dot{q})$ **Q3** $k_v = 16000$ OK

$$P(\dot{q}) = \frac{2B}{V_0 \, \dot{q}} \left[Q(\dot{q}) - S \dot{q} \cdot \lambda(\dot{q}) \right]$$

$$P(\dot{q}) = \underbrace{\frac{2BS}{V_0}}_{H_2} \left[\underbrace{\frac{1}{S\dot{q}}}_{H_1} Q(\dot{q}) - \lambda(\dot{q}) \right]$$

Q5 $\quad I_3 \, \dot{q}^2 \theta_{31}(\dot{q}) + I_2 \, \dot{q}^2 \theta_{21}(\dot{q}) = d \times F(\dot{q})$

②

$$\theta_{31}(t) = -\frac{I_2}{I_3}\theta_{21}(t) + \frac{d}{I_3\,t^2}F(t)$$
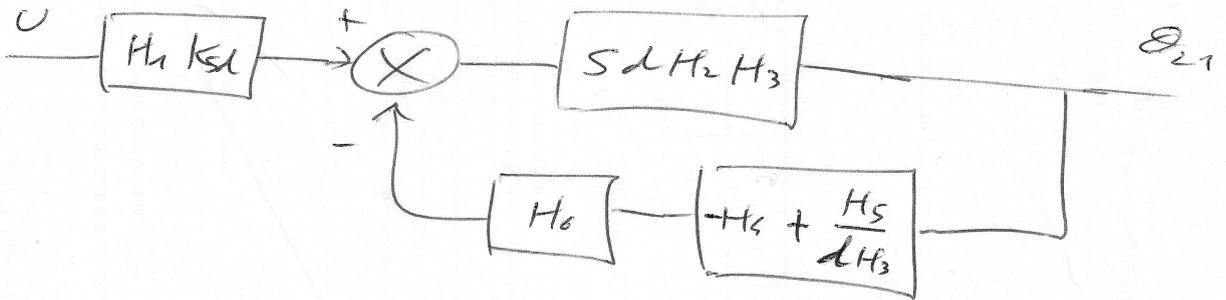
$$H_4 = \frac{I_2}{I_3} \qquad H_5 = \frac{d}{I_3\,t^2}$$

⚠

(Q6) $\quad H_6 = \frac{\lambda}{\theta_{31}} = \frac{\Delta\lambda}{\Delta\theta_{31}} = \frac{0,05}{0,1} = 0,5 \ m$

(Q7)

$$F(t) = H_1 K_{sd}\ \frac{S d\, H_2 H_3}{1 + S d\, H_2 H_3\, H_6 \left(\dfrac{-d\, H_4 H_3 + H_5}{d\, H_3}\right)}$$

AB

$$F(t) = \frac{\underbrace{S d\, H_2 H_3}\ H_1 K_{sd}}{1 + \underbrace{S H_2 H_6}_{A}\left[H_5 - \underbrace{d H_3 H_5}_{B}\right]}$$

(Q8)

$$H(t) = \frac{K_c}{t(1+t) + K_c} = \frac{1}{\dfrac{t^2}{K_c} + \dfrac{t}{K_c} + 1} \quad \Big|\ K=1$$

$$w_0 = \sqrt{K_c} \quad ; \quad K=1$$

$$\frac{2\zeta}{w_0} = \frac{1}{K_c} \implies \zeta = \frac{1}{2\sqrt{K_c}}$$

$\zeta = 1 \implies K_c = \frac{1}{4} = 0,25$

Perf = Précis $\quad K=1$

$w_0 = 0,5 \qquad t_{5\%}\, w_0 = 5$

$t_{5\%} = \frac{5}{0,5} = 10\,s$