Nicolas Lamlein

RT1 - Assistenz - Übung 9 - 20.11.15

Gegeben $P_1(s) = \frac{1}{0{,}5s+1}$ $P_2 = \frac{1}{-0{,}5s+1}$ $C(s) = K_p$

$L_1(s) = \frac{K_p}{0{,}5s+1}$ $S_1(s) = \frac{0{,}5s+1}{0{,}5s+1+K_p}$ $T_1(s) = \frac{K_p}{0{,}5s+1+K_p}$

$L_2(s) = \frac{K_p}{-0{,}5s+1}$ $S_2(s) = \frac{-0{,}5s+1}{-0{,}5s+1+K_p}$ $T_2(s) = \frac{K_p}{-0{,}5s+1+K_p}$

asy. stabil if $P(s)$, $C(s)$ are asy. stabil

Pole:

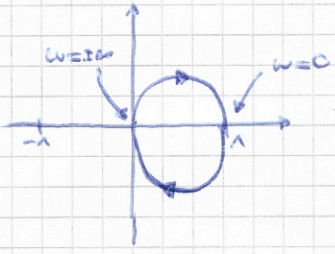
① $\pi_1 = -\frac{1+K_p}{0{,}5} = -2-2K_p$ $\pi_1 < 0$ $-2-2K_p < 0$ $K_p > -1$

② $\pi_2 = \frac{1+K_p}{0{,}5} = 2+2K_p$ $\pi_2 < 0$ $2+2K_p < 0$ $K_p < -1$

∧ don't know

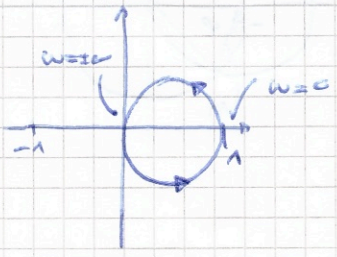
Nyquist kriterium

System ① ($P_1(s)$)



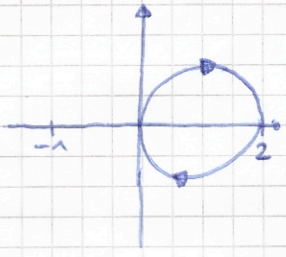
$M_+ = 0$ $M_0 = 0$ $M_\infty = 0$

System ② ($P_2(s)$)



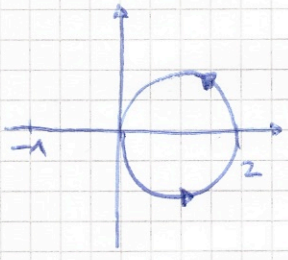
$M_+ = 1$ $M_0 = 0$ $M_\infty = 1$

System ①, $K_p = 2$



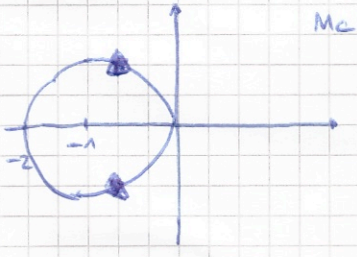
$M_c = 0$ ✓

System ②, $K_p = 2$



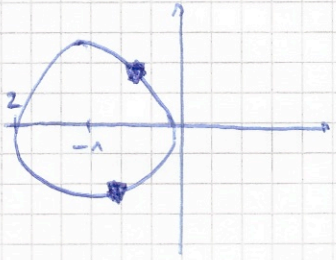
$M_c = 0$ ×

System ①, $K_p = -2$



$M_c = -1$ ×

System ②, $K_p = -2$



$M_c = 1$ ✓

Da

Gegeben $\angle(s) = \frac{-10}{-s+8}$

- ω_c: $\frac{10}{\sqrt{\omega_c^2+8^2}} = 1 \quad 10^2 = \omega_c^2 + 8^2 \rightarrow \omega_c = 6 \text{ rad/s}$
- φ: $\angle(\angle(j\omega_c)) = \angle(10) - \angle(-j\omega_c+8) = \arctan\left(\frac{6}{8}\right) - \pi = -143{,}13°$

$\rightarrow \varphi = 180 + \angle(\angle(j\omega_c)) \approx 36{,}9°$