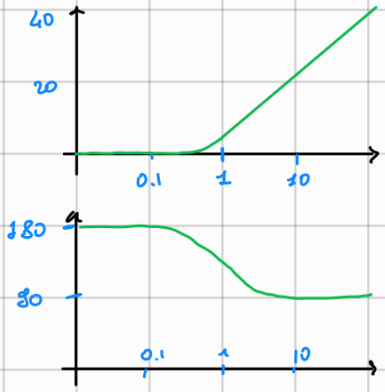
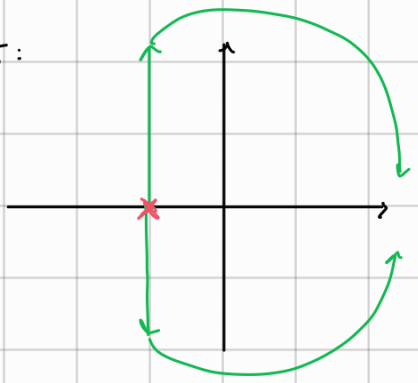
- Disegna Nyquist per $G(s) = s - 1 = -1 \cdot (1 - s)$

Bode:



Nyquist:

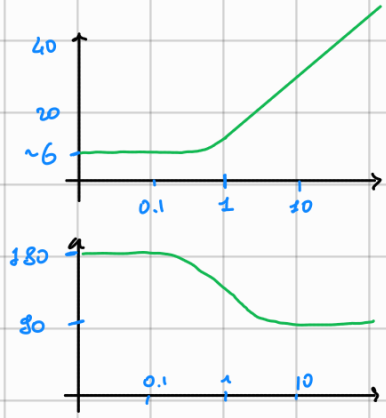


$Z = N + P \Rightarrow Z = 0 + 0 = 0 \Rightarrow$ 0 poli con $Re > 0$

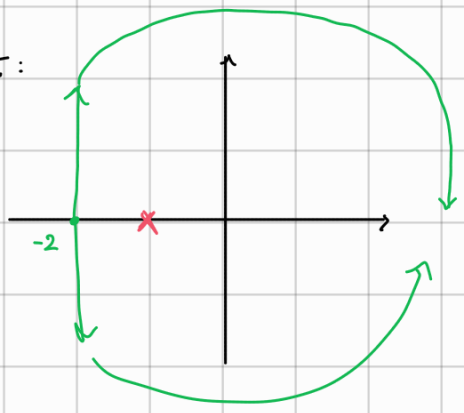
$H = \frac{G}{1+G} = \frac{s-1}{s} \Rightarrow$ 0 poli con $Re > 0$

Rifai i conti usando il controllore $R = 2$

Bode:



Nyquist:

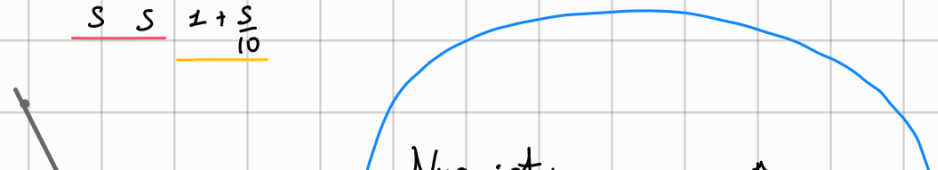


$Z = N + P \Rightarrow Z = 1 + 0 = 1 \Rightarrow$ 1 poli con $Re > 0$

$H = \frac{RG}{1+RG} = \frac{2s-2}{2s-1} \Rightarrow$ 1 poli con $Re > 0$

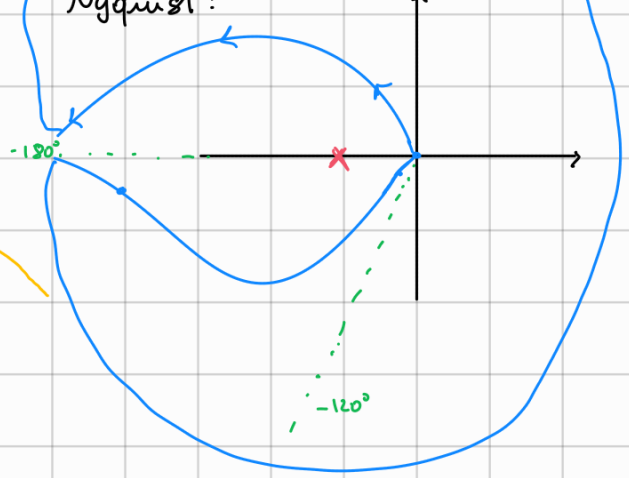
- Disegna Bode e Nyquist per $R = K$ e $G = \frac{s+1}{s^2(s+10)}$, poi discuti i margini di stabilità

$G = \frac{1}{10} \cdot (1+s) \cdot \frac{1}{s} \cdot \frac{1}{s} \cdot \frac{1}{1+\frac{s}{10}}$



Bode:

Nyquist:

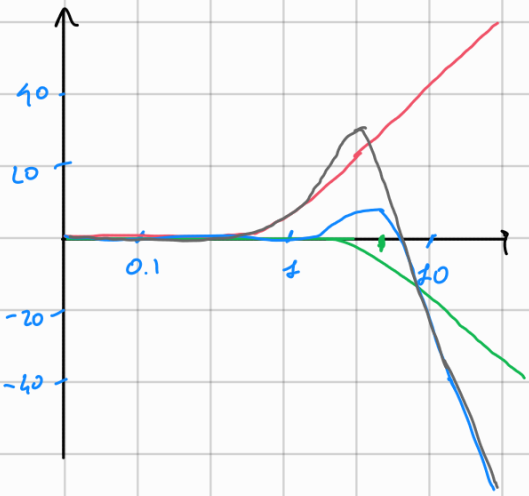


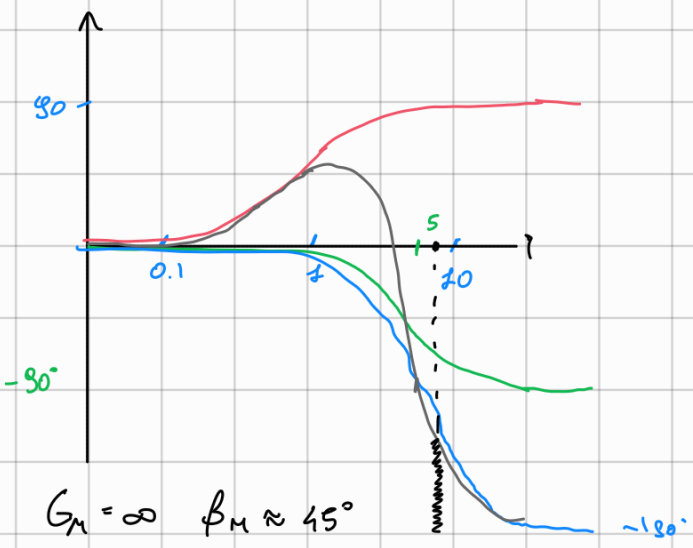
$G_M = \infty \qquad \phi_M \approx 10°$

- Bode e margini per $G = \dfrac{125(s+1)}{(s+5)(s^2+4s+25)}$

$$G = \underbrace{(s+1)}_{} \cdot \underbrace{\frac{1}{1+\frac{s}{5}}}_{} \cdot \underbrace{\frac{1}{\frac{s^2}{25}+\frac{4}{25}s+1}}_{}$$

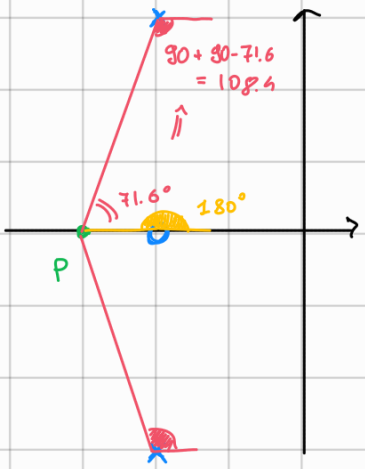
$\omega_n = 5$
$\xi = 0.4$





$G_M = \infty \qquad \beta_M \approx 45°$

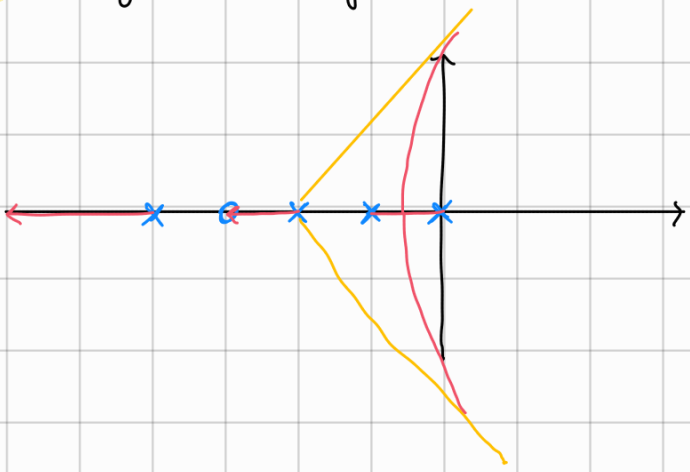
- Dato $G = \frac{K(s+2)}{(s^2+4s+13)}$ determina se $P=-3$ appartiene al luogo delle radici e in caso trova il guadagno necessario K



$\Sigma angoli = 180 + 108.4 - 108.4 = 180 = (2m+1)\pi$ con $m=0$ ✓

$K = \left|\frac{1}{G(-3)}\right| = \left|\frac{9-12+13}{-3+2}\right| = 10$

- Disegna il luogo delle radici per $G = K\frac{s+3}{s(s+1)(s+2)(s+4)}$



Asintoti $\phi_i = \frac{2i-1}{3}$: $\phi_0 = -60°$ $\phi_1 = 60°$ $\phi_2 = 180°$