$$G(s) = \frac{0,37}{s(10s+1)}$$

$OS \leq 5\%$ // $\xi\omega_n = 0,07$ // $t_r = 10\%$

$$\rightarrow \xi = \frac{-\ln(0,05)}{\sqrt{\pi^2 + \ln^2(0,05)}} = 0,69$$

$$\rightarrow \omega_n = \frac{0,07}{0,69} = 0,1014 \text{ rad/s}$$

$$pd = -0,07 \pm j0,0734$$

$$\rightarrow z = 0,1$$

$$\rightarrow p = 0,14$$

$$K = \left| \frac{1}{\frac{(s+0,1)}{(s+0,14)} \cdot \frac{0,37}{s(10s+1)}} \right|_{s=-0,07+j0,0734}$$

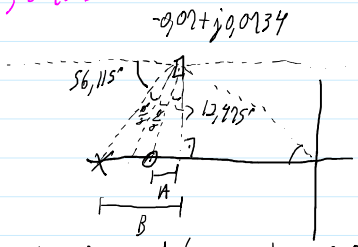
$$tg^{-1}\left(\frac{\Delta Im}{\Delta Re}\right)$$

$$K = \frac{1}{3,5966} = 0,278$$

$$K_v = \lim_{s\to 0} s\left| 0,278 \cdot \frac{(s+0,1)}{(s+0,14)} \cdot \frac{0,37}{s(10s+1)} \right| = \frac{0,278 \cdot 0,1 \cdot 0,37}{0,14 \cdot 1} = 0,0735$$

$$e_{ss} = \frac{1}{0,0735} = 13,6054$$

$$\rightarrow \theta = -180 - (-133,64° - 67,77°) = 21,41°$$



$$A = 0,0734\, tg(12,475°) = 0,0162$$

$$B = 0,0734\, tg(21,41° + 12,475°) = 0,0993$$

$$z = 0,07 + 0,0162 = 0,0862$$

$$p = 0,07 + 0,0993 = 0,1193$$

$$K_+ = \left| \frac{(s+0,1193)\, s(10s+1)}{(s+0,0862)\, 0,37} \right|_{s=-0,07+j0,0734} = 0,2557$$

$$K_{v+} = \lim_{s\to 0} s\left| 0,2557 \cdot \frac{(s+0,0862)}{(s+0,1193)} \cdot \frac{0,37}{s(10s+1)} \right| = \frac{0,2557 \cdot 0,0862 \cdot 0,37}{0,1193 \cdot 1} = 0,0684$$

$$e_{ss+} = \frac{1}{0,0684} = 14,6199 = 1462\%$$

$$K_{v-} = \frac{z}{p} \cdot K_{v+} \rightarrow \frac{1}{0,1} = \frac{z}{p} \cdot 0,0684 \rightarrow \frac{z}{p} = \frac{1}{0,1 \cdot 0,0684} = 146,1988$$

$y = 196,1988\,\rho$

* Adotando: $\rho = 0,000001 \rightarrow z = 0,0001962$

$$K_- = \left| \frac{(s+0,000001)\cdot(s+0,1193)\,s(10s+1)}{(s+0,0001962)(s+0,0862)\,0,37\cdot 0,2557} \right|_{s=-0,09+j0,034} \simeq 1,0009$$