

# ★ Analise de sistemas no Domínio das Frequências.

4/6/2009

21:00

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

$$1 + G(s) \cdot H(s)$$

$$1 + G(s) \cdot H(s) = 0$$

$$G(s) \cdot H(s) = -1$$

$$|-1| = 1 \Rightarrow 20 \log_{10} |1| = 0 \text{ dB.}$$

$$\angle -1 = 180^\circ.$$

$$\frac{K G(s)}{1 + K G(s) \cdot H(s)}$$

$$1 + K G(s) \cdot H(s)$$

what are we doing here.

>> calcular Margem ganho.

>> calcular Margem de fase.

1 d)

$$G(s) = \frac{10}{s(s^2 + 0,4s + 4)}$$

$$= \frac{1}{s} \cdot 10 \cdot \frac{1}{s^2 + 0,4s + 4}$$

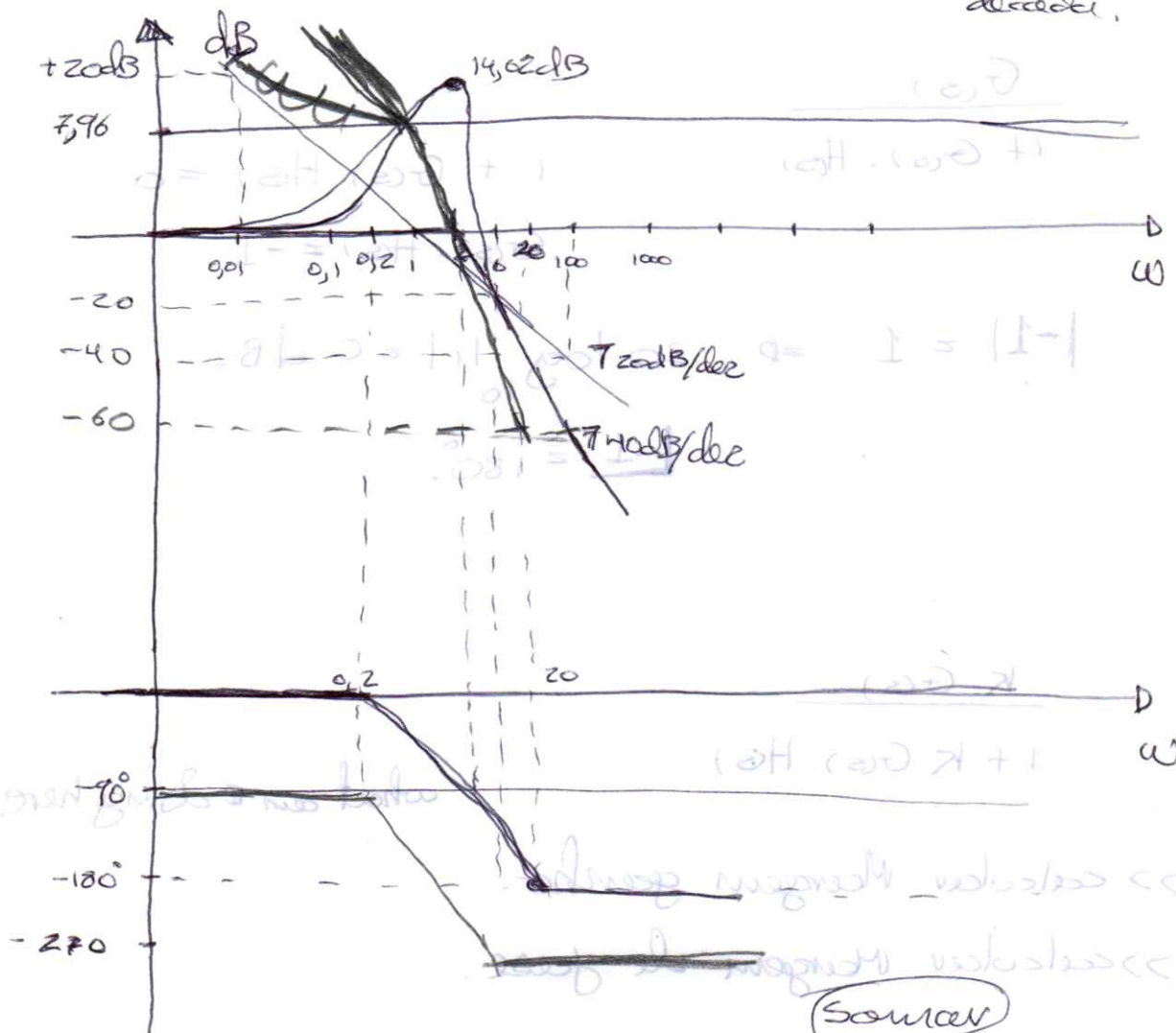
$$= \frac{1}{s} \times 2,5 \times \frac{4}{s^2 + 0,4s + 4}$$

$$= \frac{1}{s} \times 2,5 \times \frac{1}{\frac{s^2}{4} + 0,1s + 1}$$

$$\omega_n^2$$

$$20 \log_{10}(2,5) = 7,959$$

$\frac{1}{s} \Rightarrow 20 \text{ dB/dec}$   
decrease.



Sonner  
Lapiz

$$\begin{aligned} \omega_n^2 &= 4 \\ \Rightarrow \omega_n &= 2 \end{aligned} \quad \frac{1}{s^2} \dots 40 \text{ dB/dec}$$

$$2 \xi \omega_n = 0,4 \Leftrightarrow \xi = \frac{0,4}{4} = 0,1$$

$\xi < 0,707 \Rightarrow$  Resonância

$$\omega_r = \omega_n \sqrt{1 - 2\xi^2} = 1,99 \text{ rad/s}$$

$$M_r = \frac{1}{2\xi\sqrt{1-\xi^2}} = 5,025 \Rightarrow 14,02 \text{ dB}$$