

$$P_{15}(s) = \frac{1000 (5+0.5)^3 (s+1)}{s^2 (s^2+4) (s+8)} = \frac{1000 \cdot 0.5^3}{4 \cdot 8} \cdot \frac{(1+2s)^3 (1+s)}{s^2 (1+\frac{1}{4}s^2) (1+\frac{1}{8}s)}$$

$$= \underbrace{(3.9)}_{\approx 12dB} \frac{(1+2s)^3 (1+s)}{s^2 (1+\frac{1}{4}s^2) (1+\frac{1}{8}s)}$$

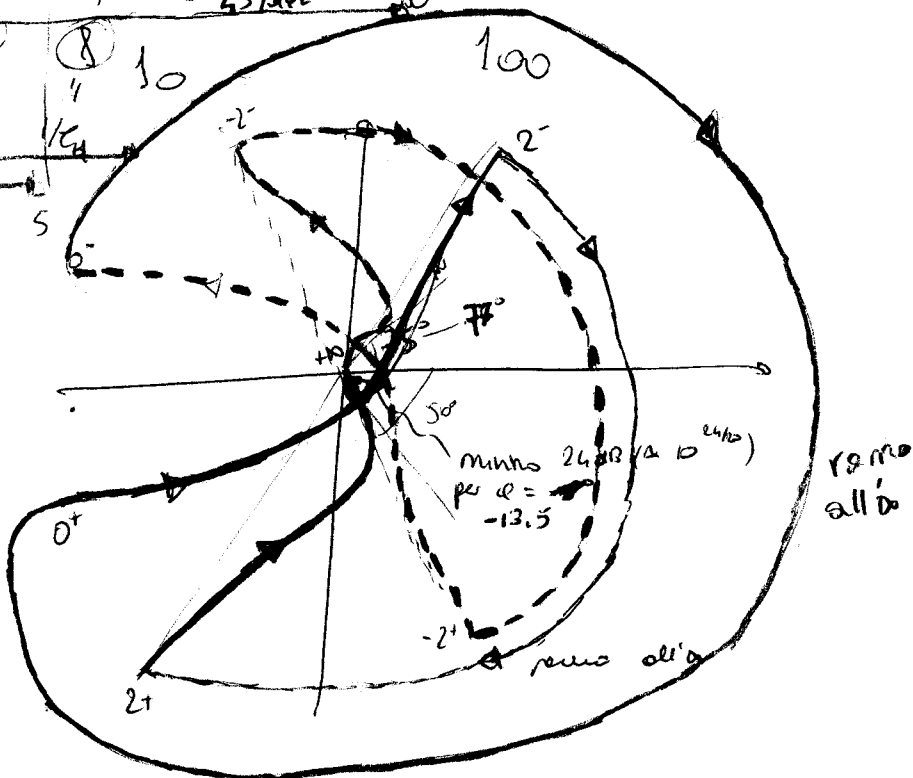
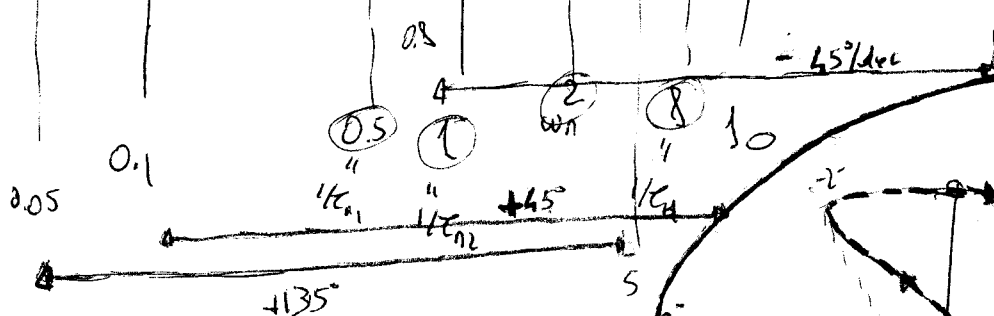
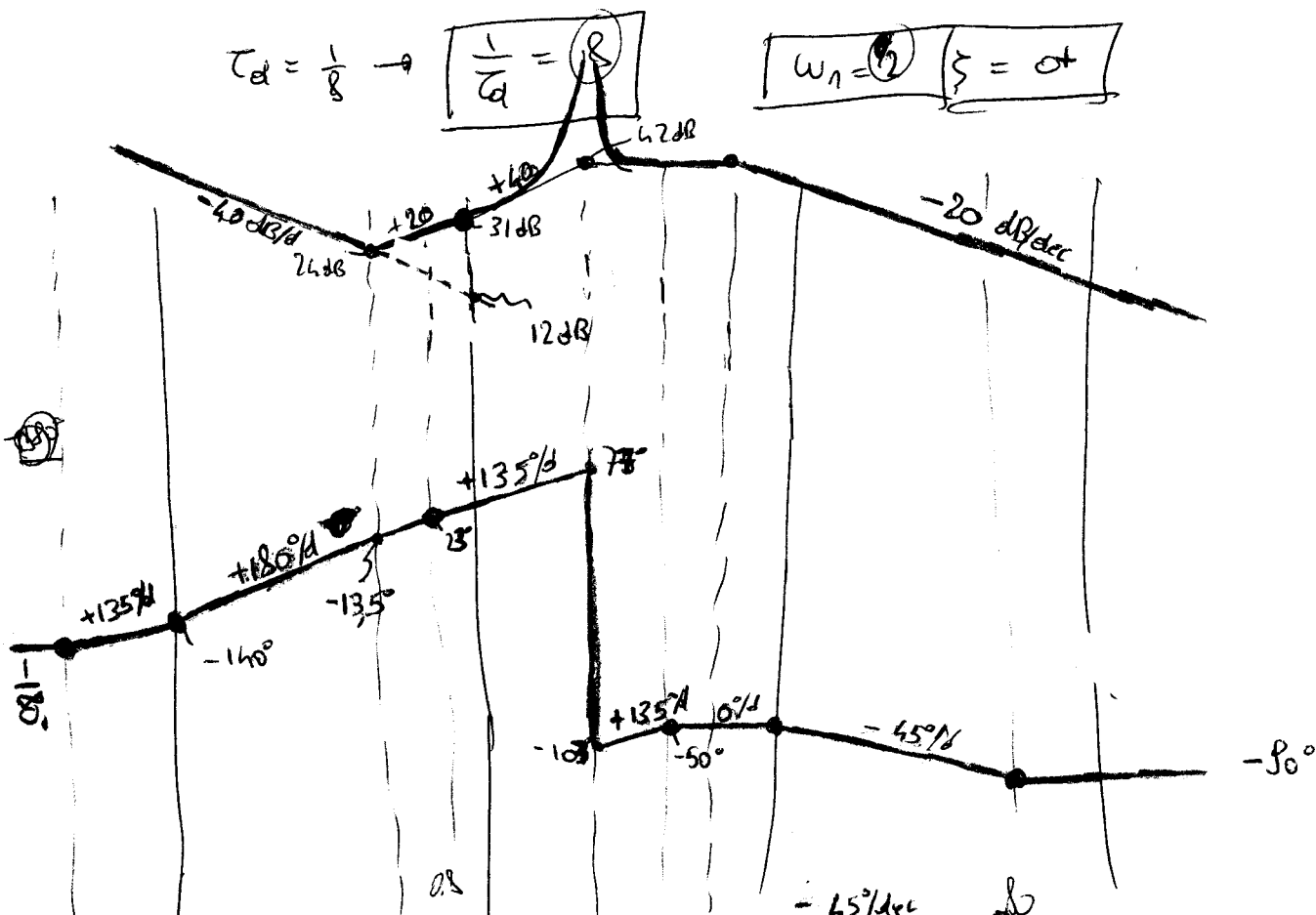
$$\tau_{n1} = 2 \quad \tau_{n2} = 1$$

$$\boxed{\frac{1}{\tau_{n1}} = \frac{1}{2}}$$

$$\boxed{\frac{1}{\tau_{n2}} = 1}$$

$$\tau_d = \frac{1}{8} \rightarrow \boxed{\frac{1}{\tau_d} = 8}$$

$$\boxed{\omega_n = 2} \quad \boxed{\zeta = 0}$$



$$\begin{aligned} N &= 0 \\ P &= 0 \\ \sum \text{res. stab.} & \end{aligned}$$

(No stab. pts. regulate)