$$R_N = \frac{V_s}{i_c} = r_{CE_6}\left[1 + \frac{\beta R_7}{r_{BE_6} + R_7}\right] + \frac{R_7 \, r_{BE_6}}{R_7 + r_{BE_6}}$$

* application numérique :

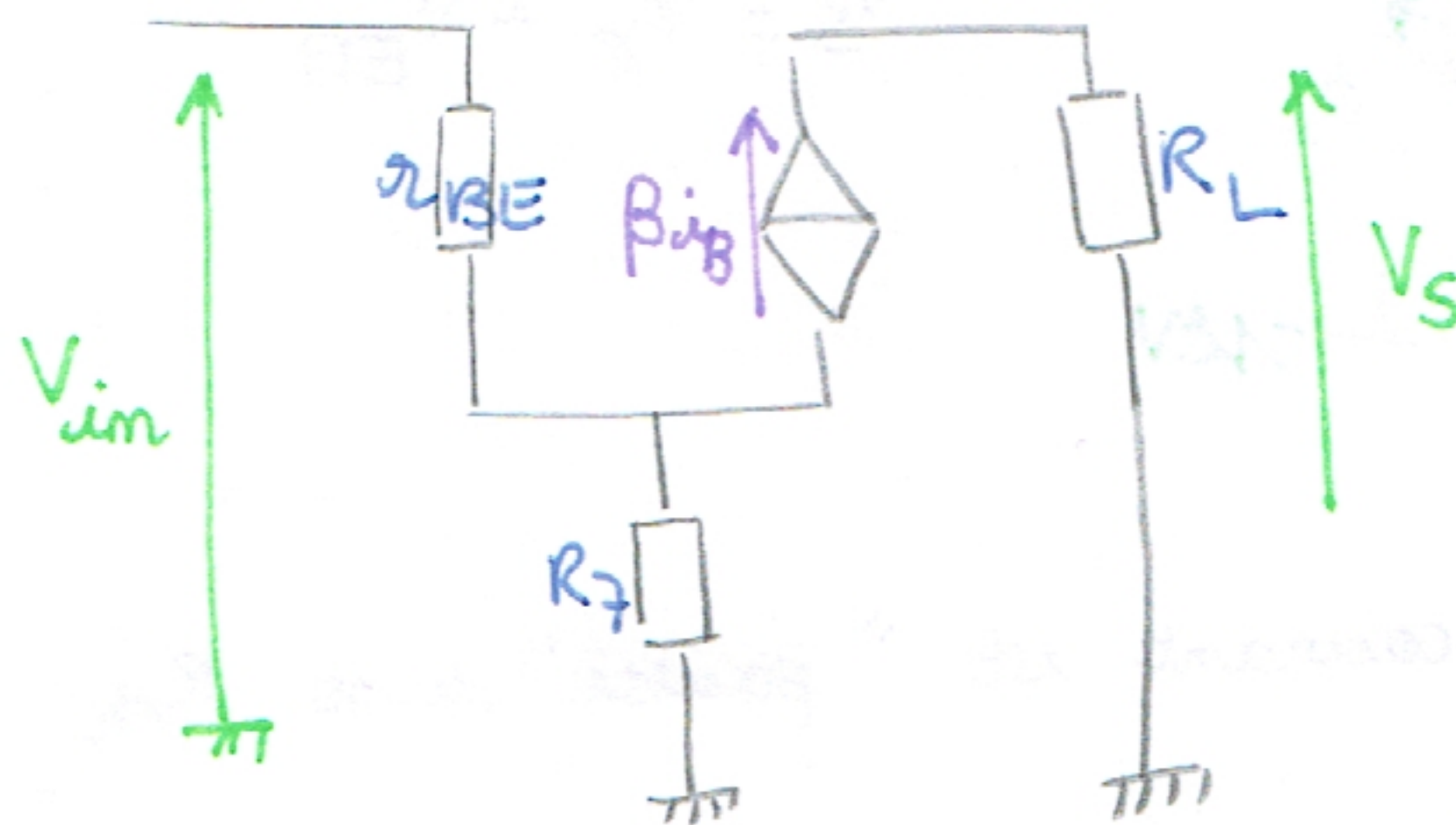$$\rightarrow r_{CE_6} = \frac{V_{early}}{I_0} = \frac{50}{4.10^{-3}} = 12\,500 \; \Omega \; .$$

$$\rightarrow r_{BE_6} = \frac{U_T}{I_{B0}} = \frac{U_T}{I_0/\beta} = \frac{25.10^{-3} \times 100}{4.10^{-3}} = 625 \, \Omega \; .$$

$$\Rightarrow R_N = 12\,500 \times \left(1 + \frac{100 \times 150}{625 + 150}\right) + \frac{150 \times 625}{150 + 625}$$

$$\boxed{R_N = 254,6 \; k\Omega \; .}$$

4/ $A_v = \dfrac{V_s}{V_{in}}$

* $V_s = \beta i_B R_L$

* $V_{in} = r_{BE} \, i_B + (\beta + 1) R_7 \, i_B$

$$\Rightarrow A_v = \frac{\beta R_L}{r_{BE} + (\beta+1)R_7} \simeq \frac{R_L}{R_7} = \frac{-10k}{150}$$

$$\Rightarrow \boxed{A_v = 66,7} \qquad G_{dB} = 20 \log(1/66,7) = \quad 36,48 \; dB$$