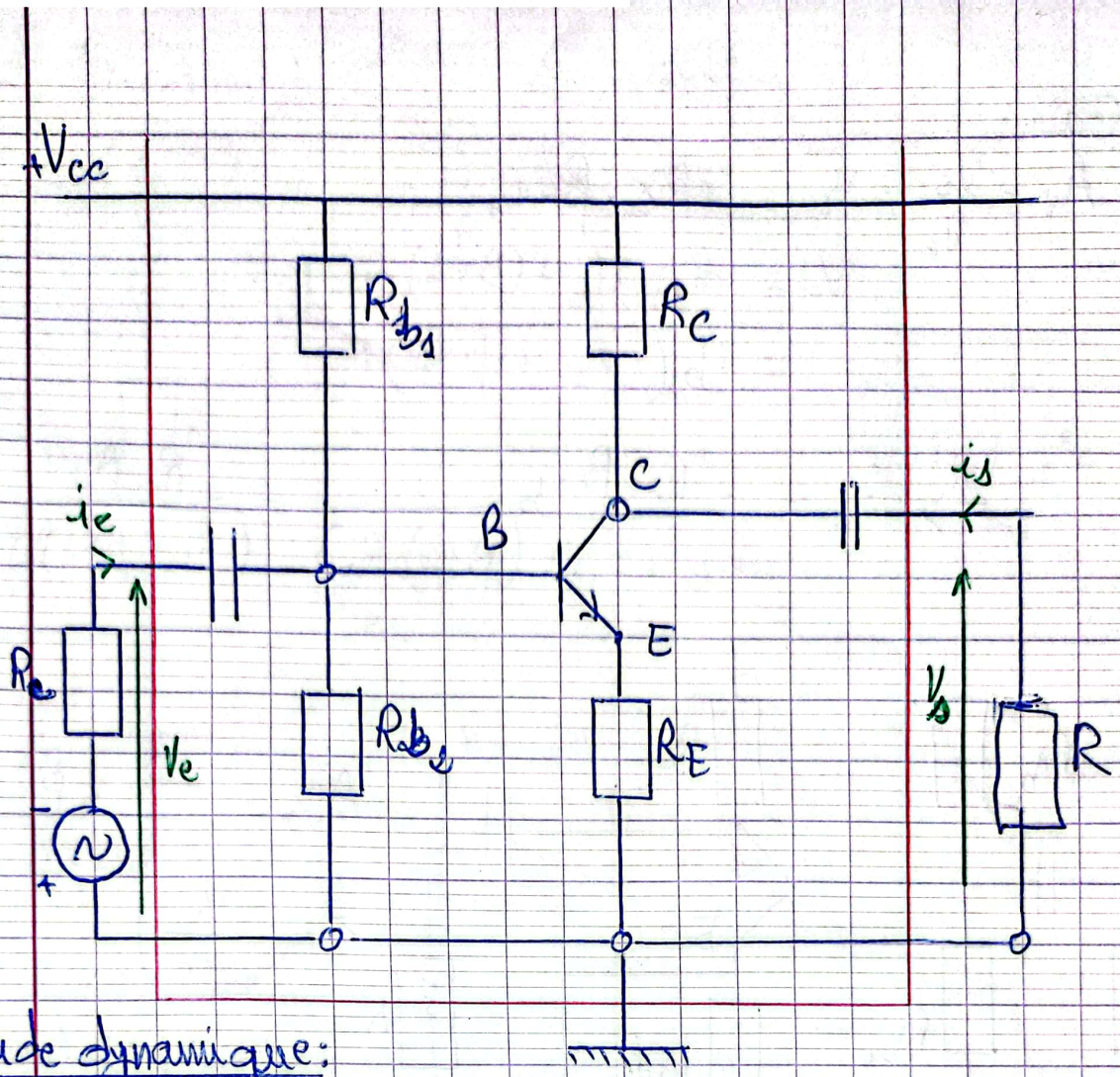
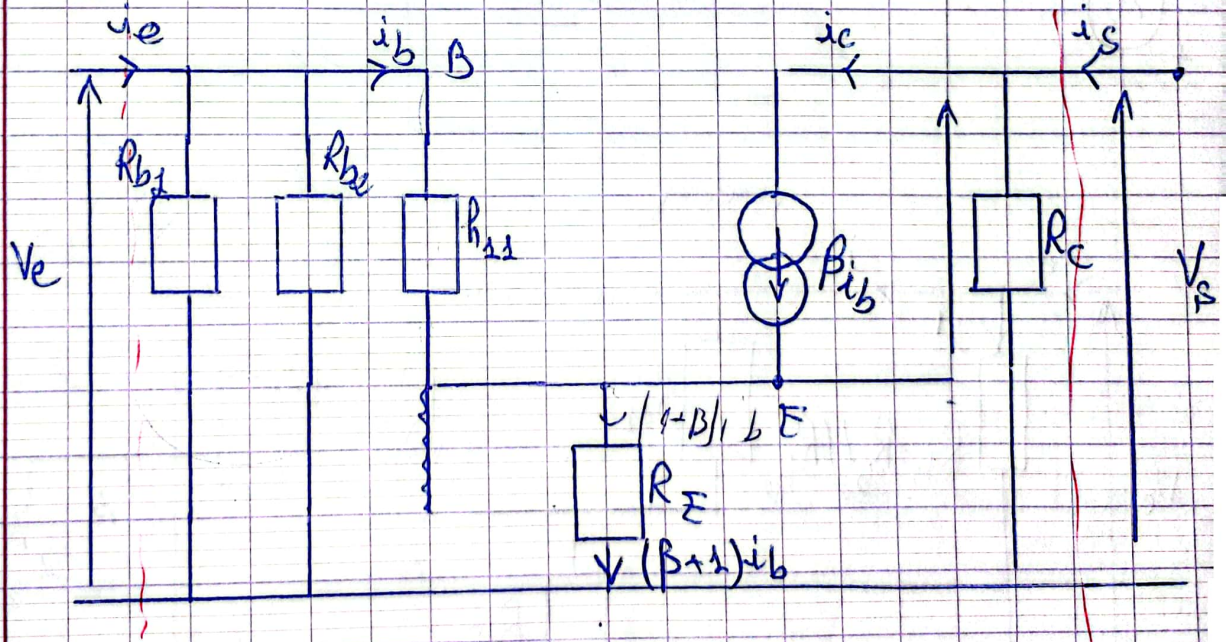


Etude dynamique:



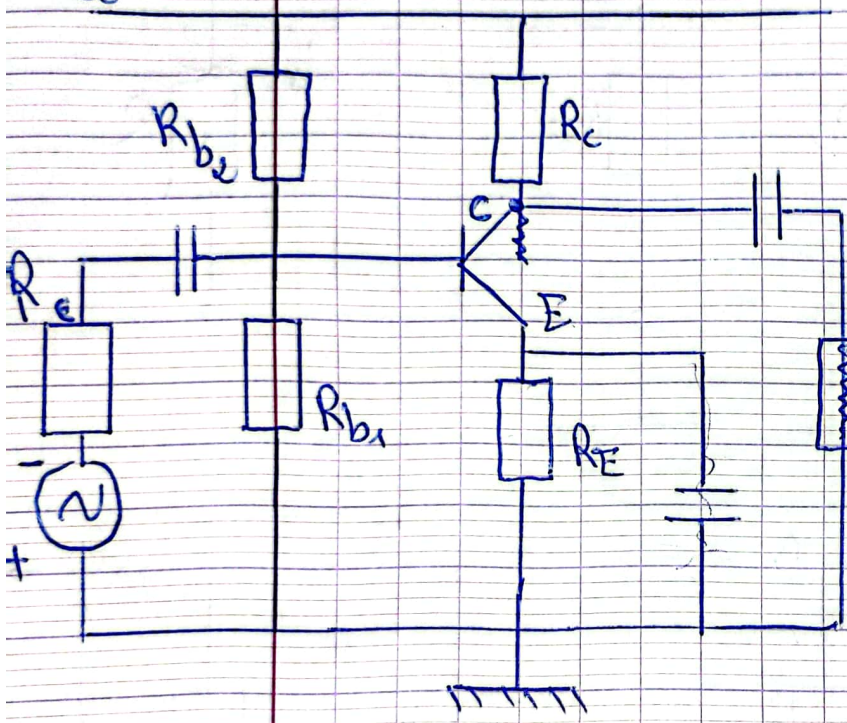
Gain :

$$A_V = \frac{V_s}{V_e} \; ; \; V_s = -R_C \cdot \beta \, i_b$$

$$V_e = h_{11} i_b + (\beta+1) i_b \cdot R_E$$

$$= i_b \left(h_{11} + (\beta+1) R_E \right)$$

$$\Rightarrow A_v = \frac{-R_C \beta i_b}{i_b \left(h_{11} + (\beta+1) R_E \right)} = \frac{-R_C \beta}{\left(h_{11} + (\beta+1) R_E \right)}$$



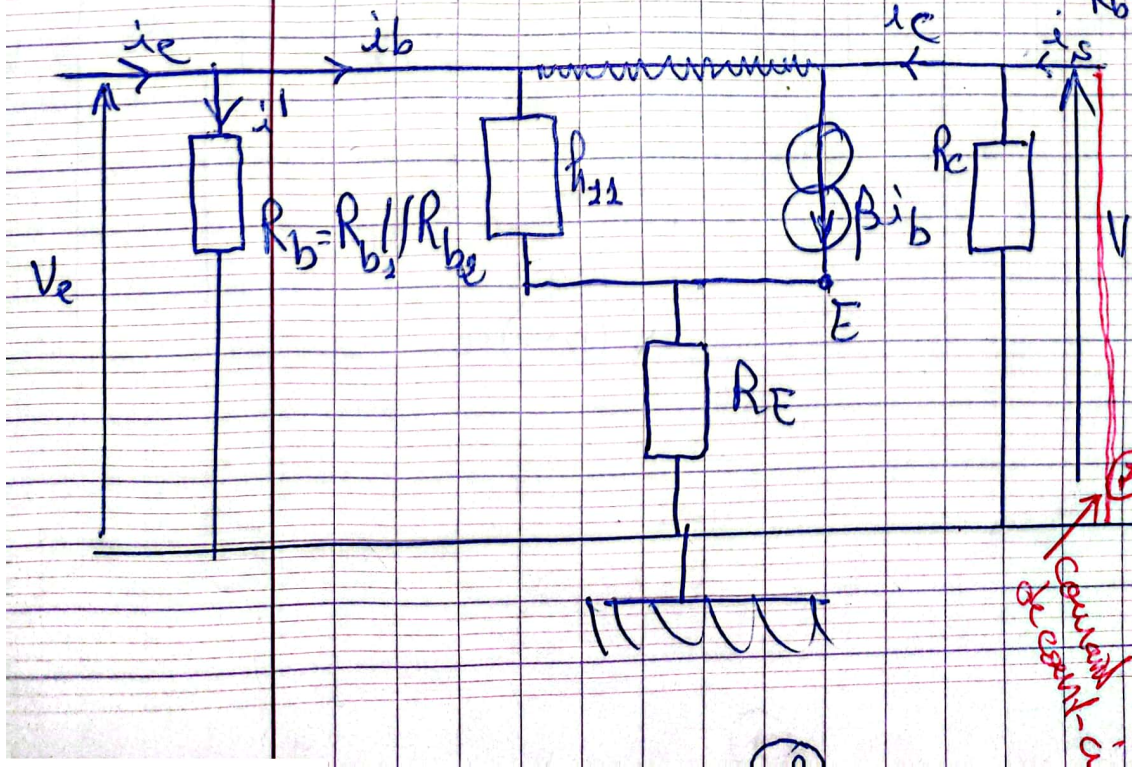
$$A'_v = \frac{-R_C \cdot \beta i_b}{h_{11} i_b} = \frac{-R_C \beta}{h_{11}}$$

$$Z_e = \frac{V_e}{i_e}\Big|_{i_s=0}$$

Découplage (sans R_E) $\rightarrow A_V^{(1)}$

$$i_e = i' + i_b = \frac{V_e}{R_b} + \frac{V_e}{\left(h_{11} + (\beta+1) R_E \right)}$$

$$Z_e = \frac{V_e}{\frac{V_e}{R_b} + \frac{V_e}{\left(h_{11} + (\beta+1) R_E \right)}}$$



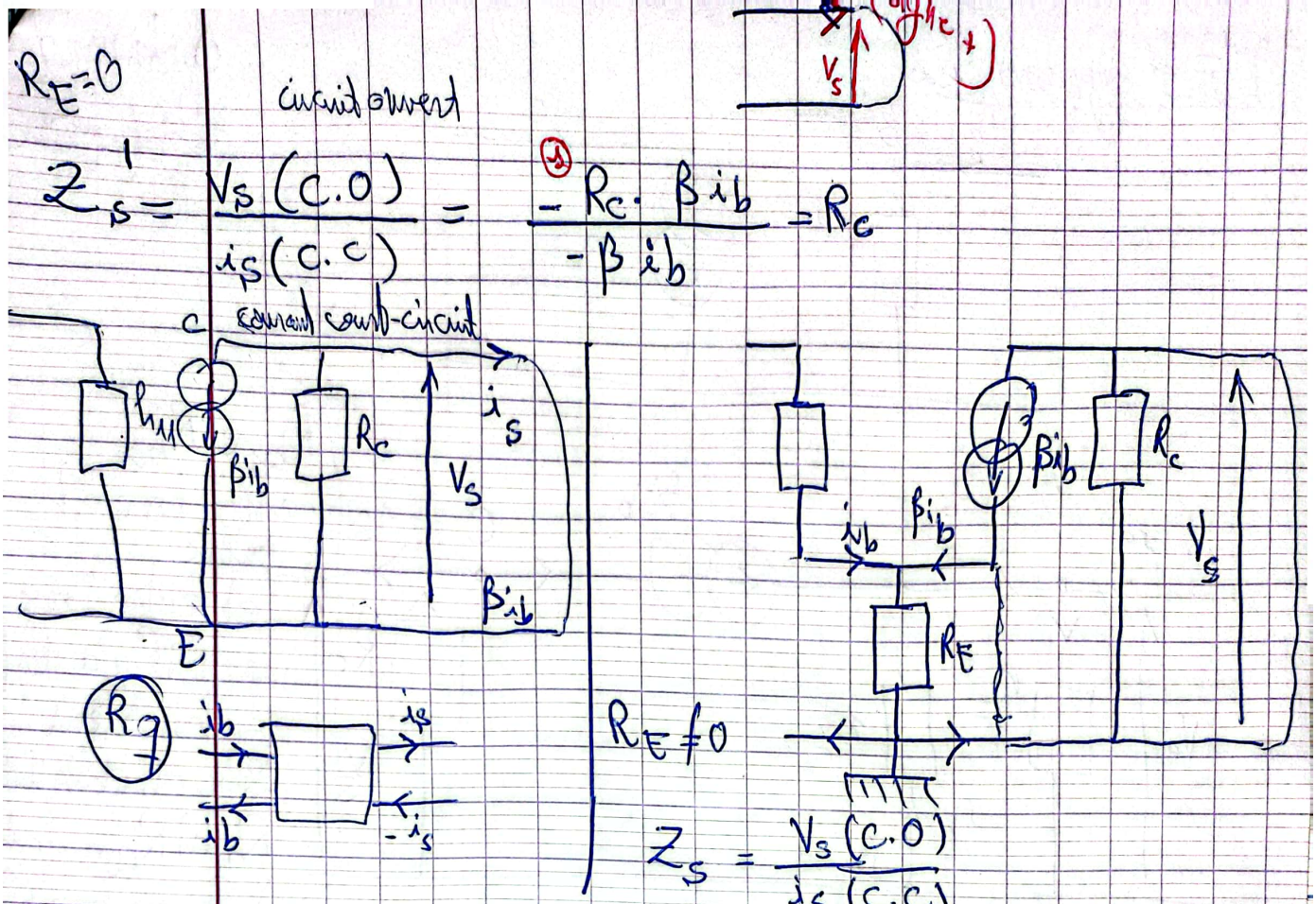
$$Z_e = R_b // \left(h_{11} + (\beta+1) \right)$$

$$Z'_e = R_b // h_{11}$$

↳ découplage pour $R_E = 0$

$R_E = 0$ circuit ouvert

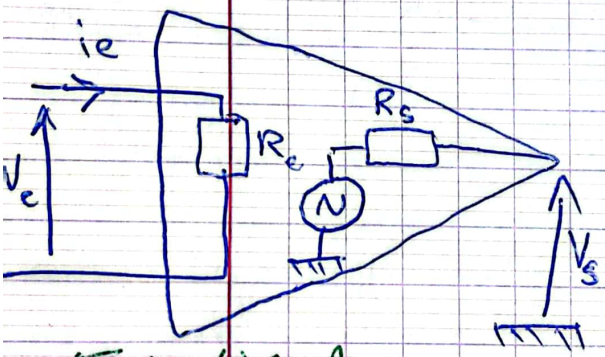
$$Z_s' = \frac{V_s(c.o)}{i_s(c.c)} = \frac{-R_c \cdot \beta i_b}{-\beta i_b} = R_c$$



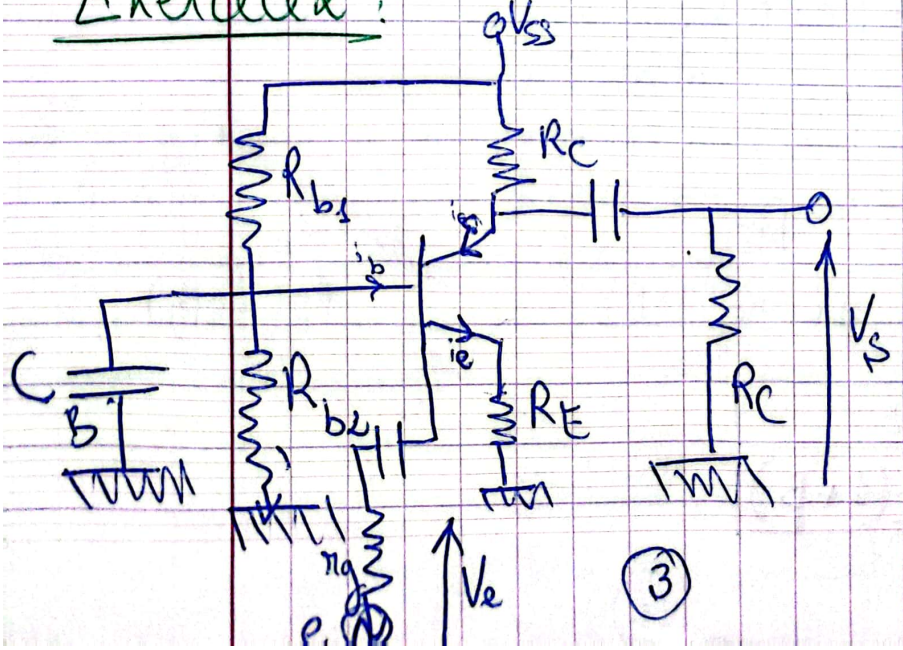
$R_E \neq 0$

$$Z_s = \frac{V_s(c.o)}{i_s(c.c)}$$

Schema equivalent :



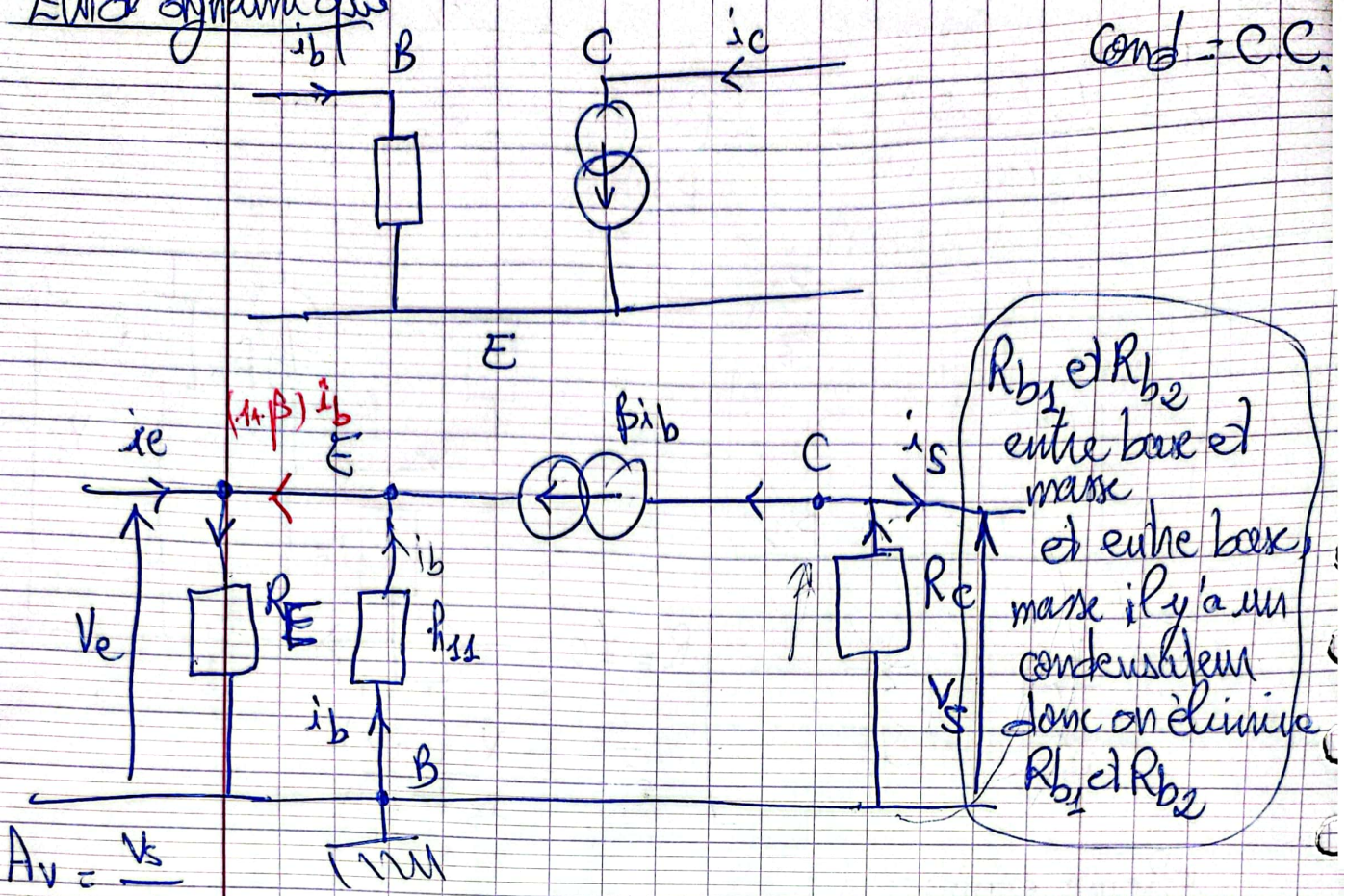
Exercice4 :



Montage base Commune

Etude dynamique

Cond + resist = C.C.



$$A_V = \frac{V_s}{V_e}$$

$$V_s = -R_c \beta i_b$$

$$\text{①} \quad V_e = -h_{11} i_b$$

$$A_V = \frac{R_c \beta}{h_{11}}$$

$\frac{V_s}{i_s}_{cc} = \frac{-i_b \beta R_c}{-i_b \beta} = R_c$

$$* \quad V_e = R_E \left(i_e + (1+\beta) i_b \right) \quad \text{et} \quad \text{①} \Rightarrow i_b = -\frac{V_e}{h_{11}}$$

$$V_e = R_E \left(i_e + (1+\beta) \frac{V_e}{h_{11}} \right)$$

$$V_e \left(1 + \frac{R_E (1+\beta)}{h_{11}} \right) = R_E i_e$$

$$\Rightarrow \frac{V_e}{i_e} = \frac{R_E}{1 + \frac{R_E (1+\beta)}{h_{11}}} = \frac{h_{11} R_E}{h_{11} + R_E (1+\beta)}$$

$$\boxed{R_e = \frac{h_{11} R_E}{h_{11} + R_E (1+\beta)}}$$

$i_s = 0$

$R_s = \dfrac{V_s(C.O)}{i_s(C.C)}$

$\dfrac{V_s^{(C.O)}}{i_s(C.C)} = \dfrac{-\beta i_b R_c}{-\beta i_b}$

$\Rightarrow R_s = R_c$

$i_s = 0$ mais $V_s \neq 0$ (on impose V_s négative)

Rq :

$I_e = \dfrac{R_2}{R_1 + R_2} I_1$

Sinon $R_2 = 0$, $I_2 = 0$

Exercice 4 :

V_{cc}, R_E, R_{b_2}, R_{b_1}, R_L, V_s, V_e, B, PNP, CC

Rq : PNP : Bons Entrant

Etude dynamique :

i_b, B, C, βi_b, E

Entrée : base
sortie : Emetteur
Masse : collecteur sortie
entrée → B
E
Masse → C

i_e, B, i_b, h_{11}, E, $(1+\beta) i_b$, i_s, βi_b, $R_{b_1} // R_{b_2} = R_B$, R_E, V_s, V_e, C

Rq : Dans l'étude Dynamique : PNP ≡ NPN

$V_e = A + B$ ← 2 lettres au lieu des mailles

$R_0 \quad R_1 // R_2 \equiv \dfrac{R_1 \cdot R_2}{R_1 + R_2}$

$A_N = \dfrac{V_s}{V_e}$; $V_s = (1+\beta) i_b R_E$

$V_e = i_b h_{11} + V_s$

$V_e = i_b h_{11} + (1+\beta) i_b R_E$

$= i_b (h_{11} + (1+\beta) R_E)$

$A_N = \dfrac{V_s}{V_e} = \dfrac{(1+\beta) R_E}{h_{11} + (1+\beta) R_E} \approx 1$

$R_e = \dfrac{V_e}{i_e} = \dfrac{V_e}{(i' + i_b)}$; $i' = \dfrac{V_e}{R_B}$ / $i_b = \dfrac{V_e}{h_{11} + (1+\beta) R_E}$

$R_E = \dfrac{V_e}{\left(\dfrac{V_e}{R_E} + \dfrac{V_e}{h_{11} + (1+\beta) R_E}\right)} = R$

$R_e = R_B // R$

$R_s = \dfrac{V_s\ (C.O)}{V_e\ (C.C)} = R_E$

$\dfrac{V_s\ (C.O)}{i_s\ (C.C)} = \dfrac{R_E (1+\beta) i_b}{(1+\beta) i_b}$