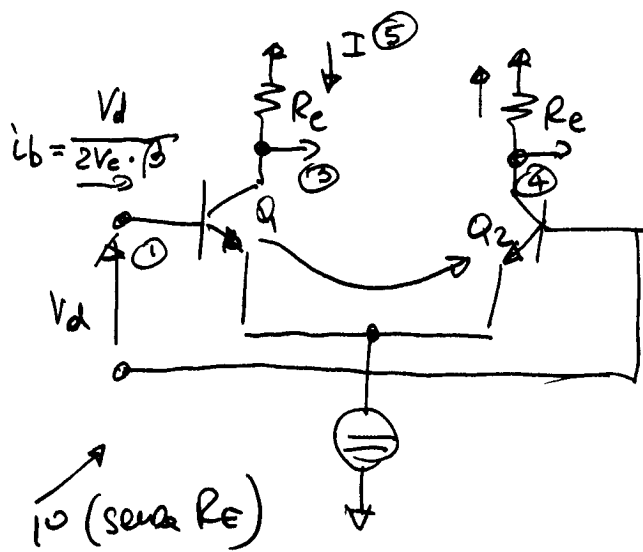




$$\textcircled{1} Z_{in} = 2r_e \cdot \beta$$

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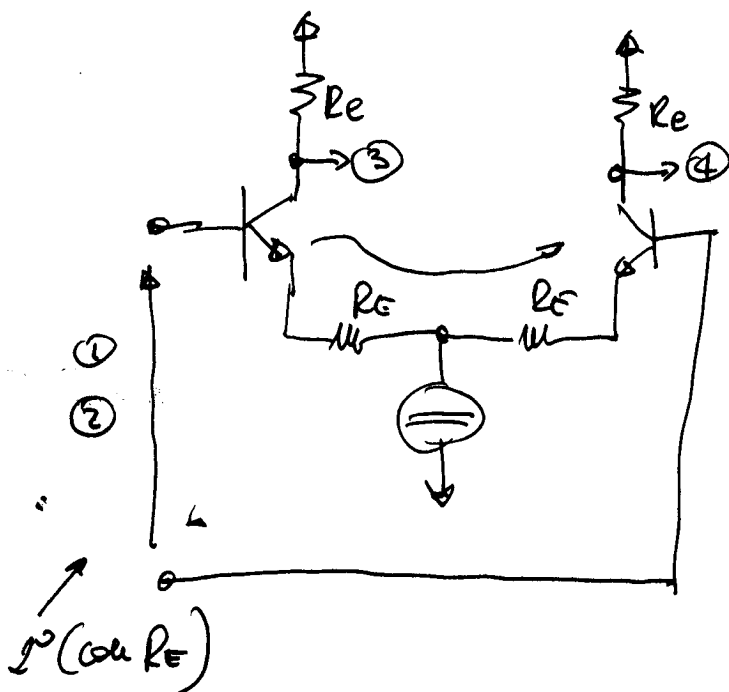
$$\textcircled{2} I_e = \frac{v_d}{2r_e}$$

$$\textcircled{3} = \frac{R_e}{2r_e} \cdot v_b$$

$$\textcircled{4} = \frac{R_e}{2r_e} \cdot v_d \quad \left(\frac{1}{2} \beta \mu R_e \right)$$

$$\textcircled{5} = I_e = \beta \mu \frac{v_d}{2} = \frac{v_d}{2r_e}$$

con R_E



$$\textcircled{1} Z_{in} = 2(r_e + R_E) \cdot \beta$$

$$\textcircled{2} i_b = \frac{v_d}{2(r_e + R_E) \cdot \beta}$$

$$\textcircled{3} = \frac{R_e}{2(r_e + R_E)} \cdot v_b$$

$$\textcircled{4} = \frac{R_e}{2(r_e + R_E)} \cdot v_d$$

$$\textcircled{5} I_e = \frac{v_d}{2r_e + 2R_E}$$

$\textcircled{3}$ o $\textcircled{4}$ uscite single ended

Uscite differenziale (fra i collettori).

$$\rightarrow 10^\circ \text{ senza } R_E \Rightarrow -\frac{1}{2} \beta \mu R_e - \frac{1}{2} \beta \mu R_e = \boxed{-\beta \mu R_e}$$

$$\rightarrow 2^\circ \text{ con } R_E \Rightarrow -\frac{R_e}{2(r_e + R_E)} - \frac{R_e}{2(r_e + R_E)} = -\frac{R_e}{r_e + R_E}$$