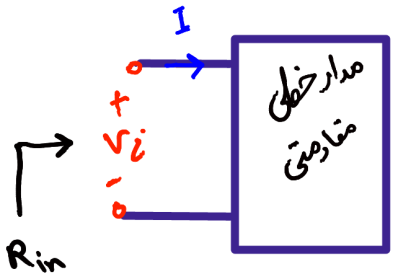
## قضیه تونن :



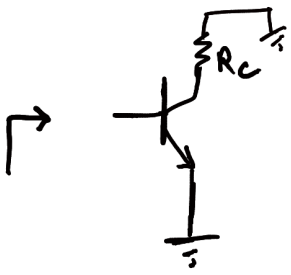

طبق این قضیه جریان عبوری از منبع ولتاژ برابر با ولتاژ تقسیم بر مقاومت ورودی

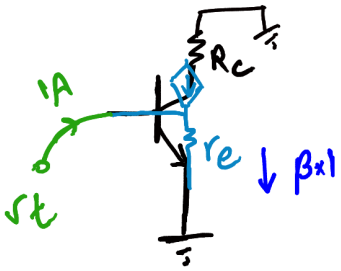
$$I = \frac{V_i}{R_{in}}$$

حال مقاومت ورودی ها را یادآوری کنیم تا بتوانیم هرکدام از ثانیه جریان ac را پیدا کنیم.

مقاومت ورودی مدارهای زیر را نسبت به زمین حساب کنید. با فرض فعال بودن

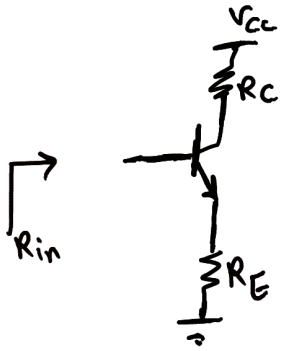
✓ در الکترونیک وقتی از یک گره می بینیم یعنی نسبت به زمین محاسبه می کنیم.

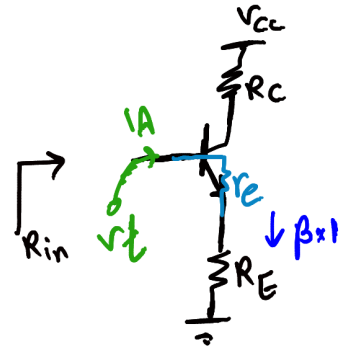



$$KVL: -V_t + r_e \times \beta = 0 \longrightarrow R_i = \beta r_e = r_\pi$$

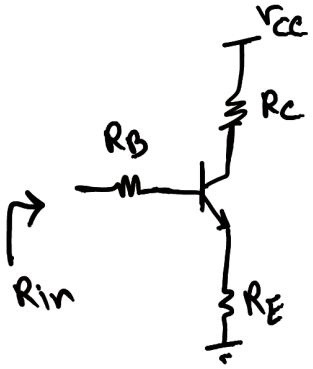
مقاومت $R_c$ وقتی $r_o = \infty$ تاثیر ندارد.

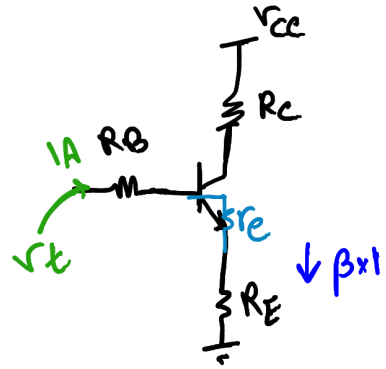



$$kvl: V_t = (r_e + R_E)\beta = r_\pi + \beta R_E$$

تاکید می‌کنم صحیح است لذا $r_e$ تاثیر ندارد

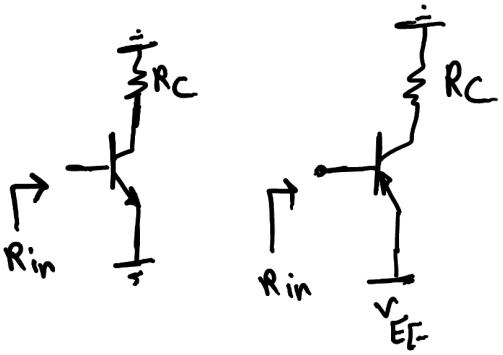


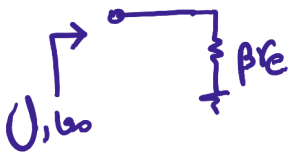



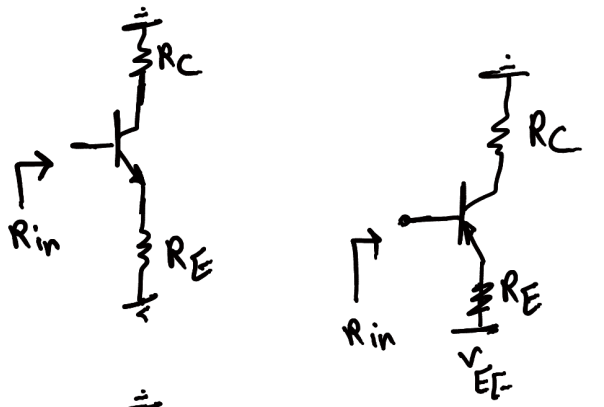

$$kvl: V_t = R_B + r_e\beta + R_E\beta$$

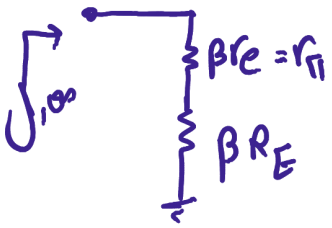
$$R_i = V_t = R_B + r_\pi + \beta R_E$$

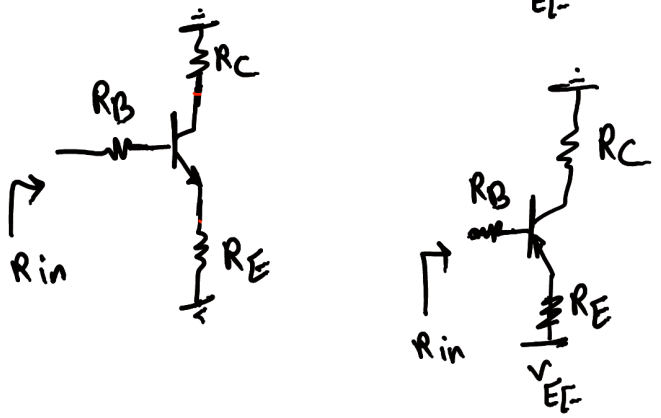
# مقاومت ac معادل از دید بیس نسبت به زمین

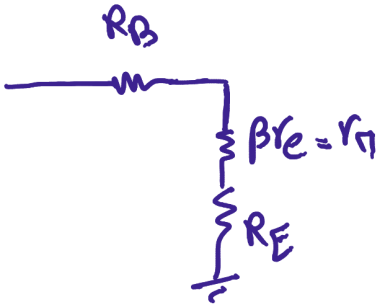


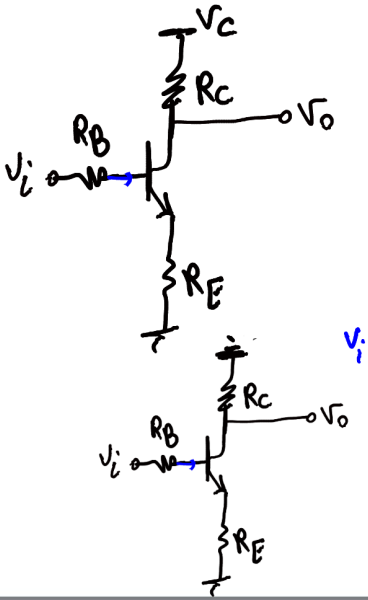



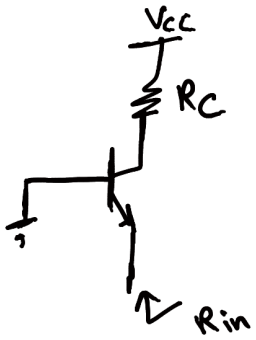



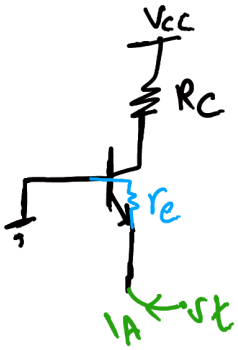




در مدار زیر جریان ac بیس امیتر را حساب کنید و سپس بهره ولتاژ

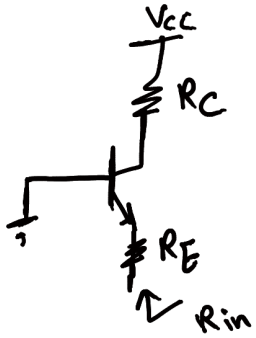
$$R_{in} = R_B + \beta r_e + \beta R_E$$

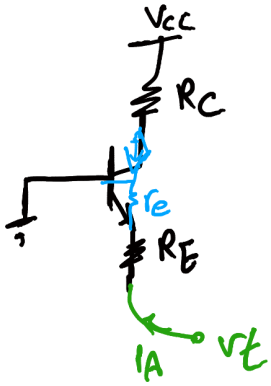
$$V_i = 1 \rightarrow i_b = \frac{1}{R_B + \beta r_e + \beta R_E} \rightarrow i_{c_{ac}} = \frac{\beta}{R_B + \beta r_e + \beta R_E} \rightarrow A_V = \frac{V_o}{V_i} = -\frac{\beta R_C}{R_B + \beta r_e + \beta R_E}$$



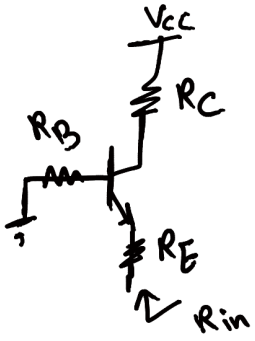



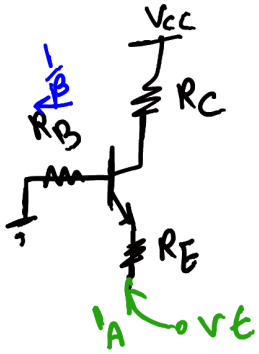

KVL: $v_t = r_e + 0$



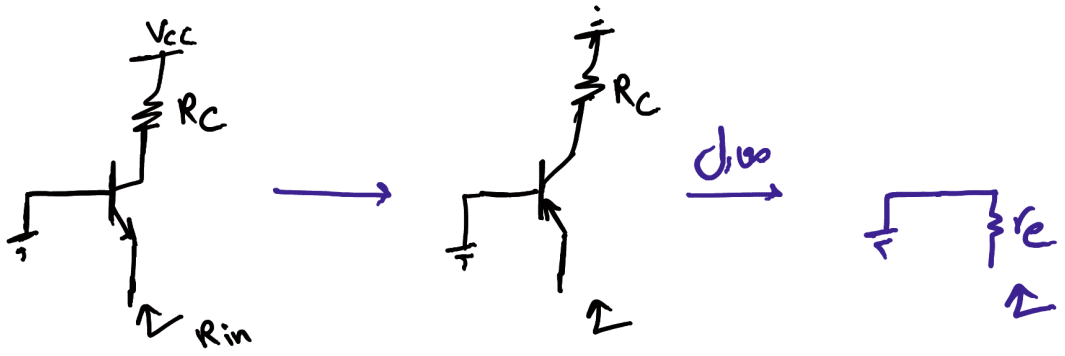



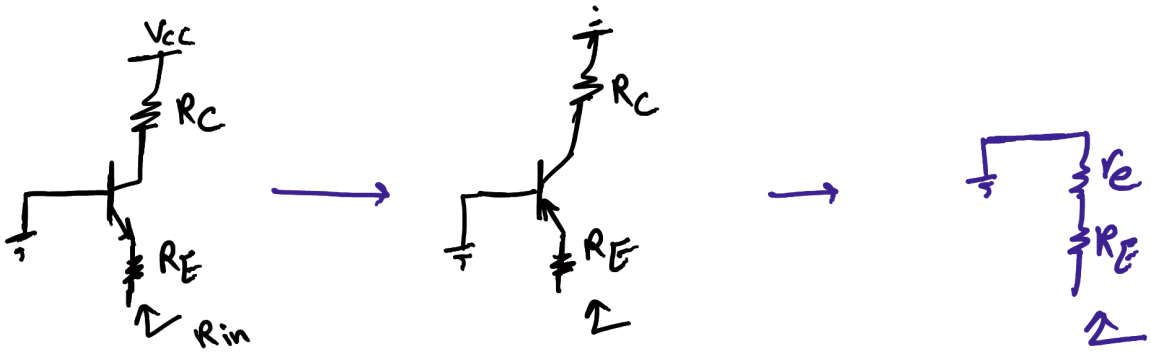

KVL: $v_t = R_E + r_e$

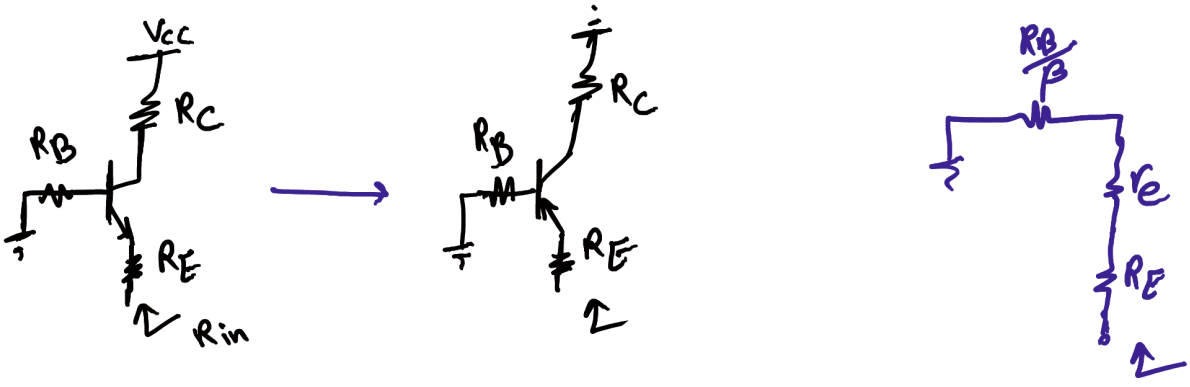



KVL: $v_t = R_E + r_e + \frac{1}{\beta} R_B$


Vcc
Rc
Rin
Rc
معادل
re


Vcc
Rc
RE
Rin
Rc
RE
re
RE


Vcc
Rc
RB
RE
Rin
Rc
RB
RE
RB
re
RE