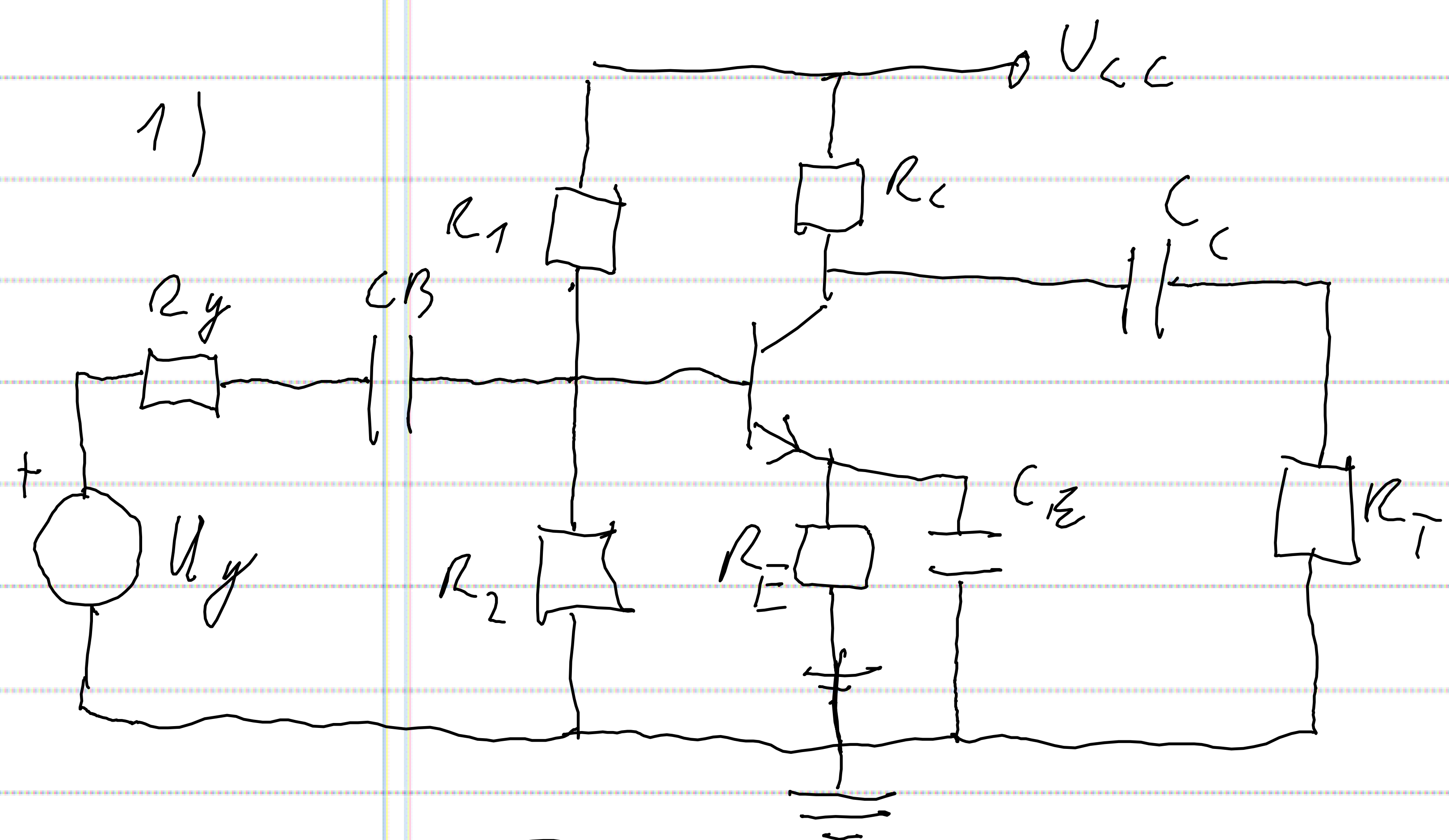
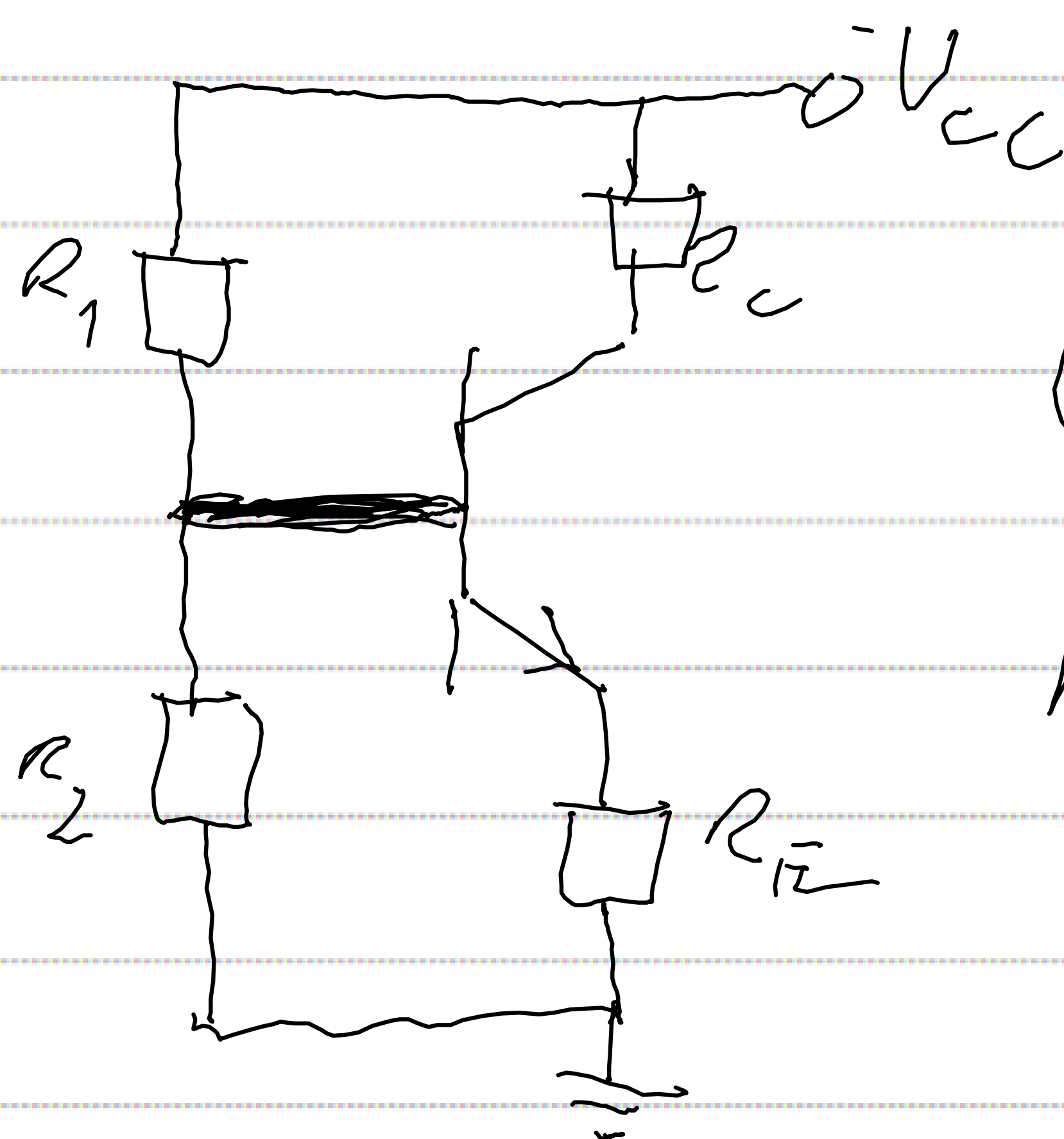


31P TRAN



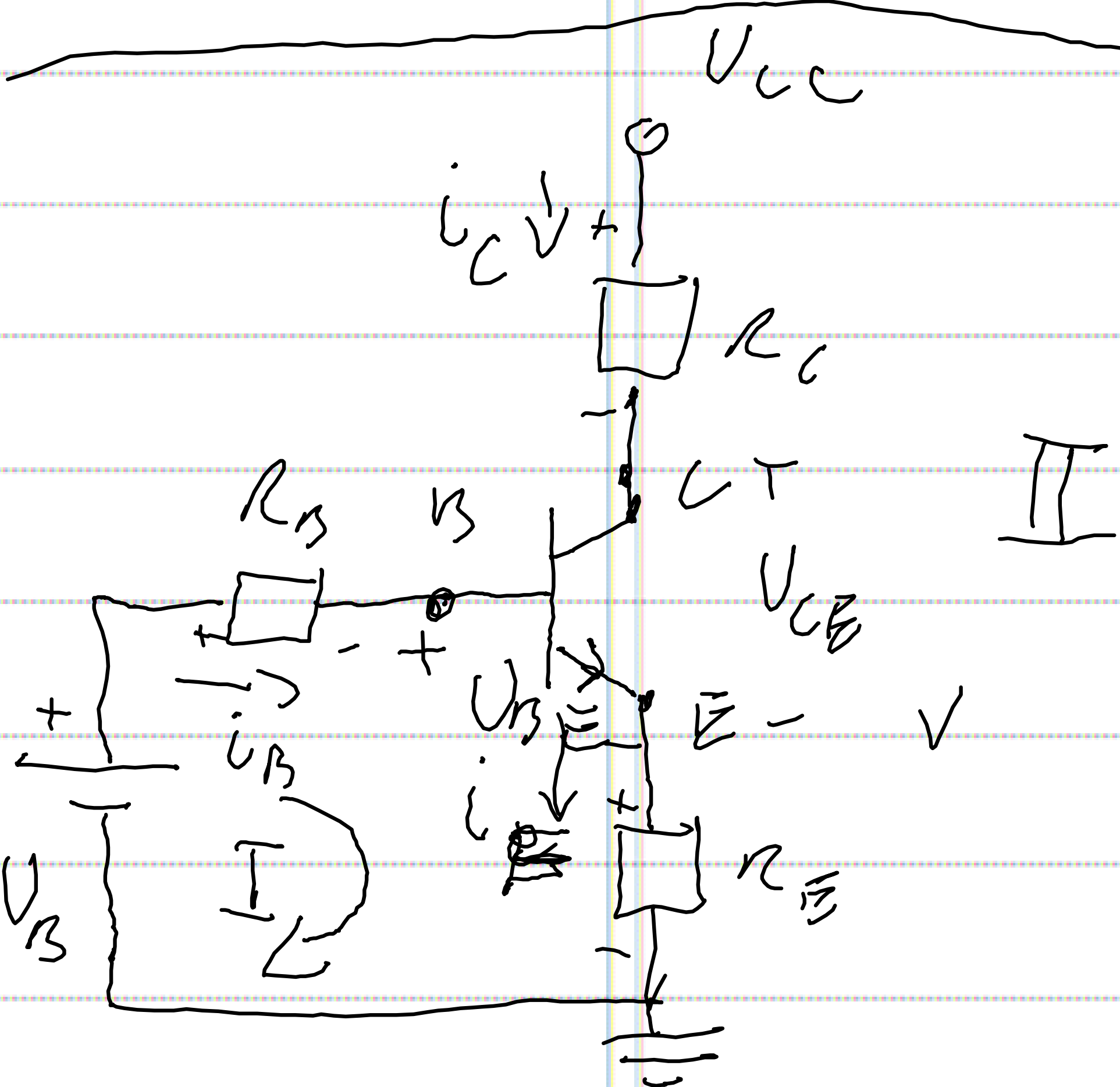
1) STATICKA

$$R_C \rightarrow \infty$$



$$U_B = \frac{V_{CC}}{R_1 + R_2} \cdot R_2$$

$$R_B = R_1 \parallel R_2 = \frac{R_1 R_2}{R_1 + R_2}$$



I)

$$U_B - i_B R_B - U_{BE} - i_E R_E = 0$$

II)

$$V_{CC} - i_C R_C - V_{CE} - i_E R_E = 0$$

$$i_C = \beta i_B$$

$$i_E = i_C + i_B = (\beta + 1) i_B$$

$$I) U_B = i_B R_B + U_{BE} + (\beta + 1) i_B R_E$$

$$i_B = \frac{U_B - U_{BE}}{(\beta + 1) R_E + R_B}$$

$$U_{BE} = U_Y \approx 0.7 V$$

$$V_{CE} = V_{CC} - \beta i_B R_C - (\beta + 1) i_B R_E$$

$$= V_{CC} - i_B [(\beta + 1) R_E + \beta R_C]$$

$$\beta \approx h_{fe}$$

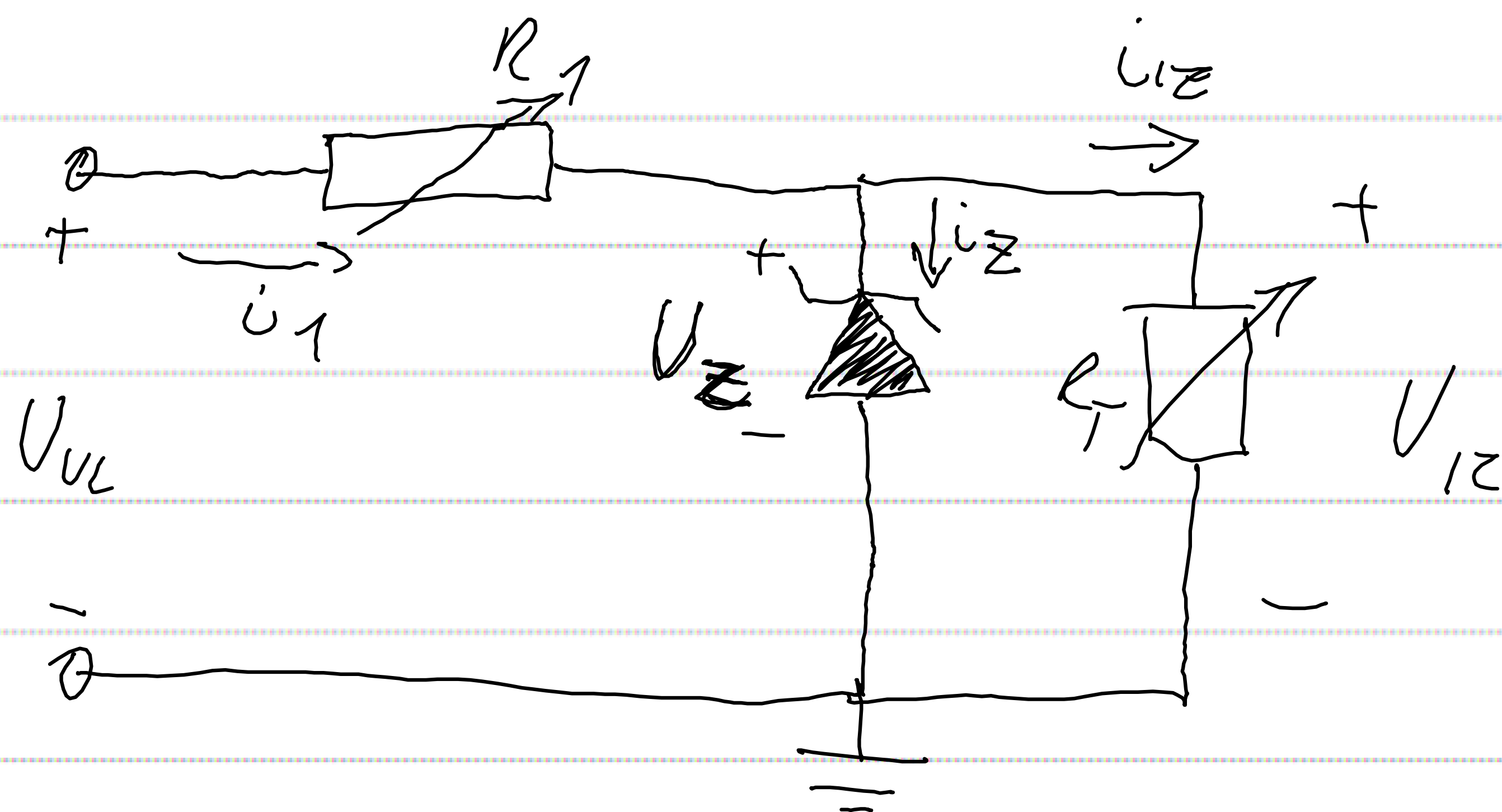
$$r_{be} = \frac{U_T}{i_B}$$

$$r_{ce} = \frac{V_{CE} + U_A}{i_C}$$

$$g_m = \frac{h_{fe}}{r_{ce}}$$

STABILIZATOR

1)



$$U_Z = 6,3 \text{ V}$$

$$I_{Z \min} = 1 \text{ mA}$$

$$P_{Z \max} = 500 \text{ mW}$$

$$r_Z = 1 \Omega$$

$$U_{VL} \in \langle 13, 14 \rangle \text{ V}$$

$$R_T \geq 220 \Omega$$

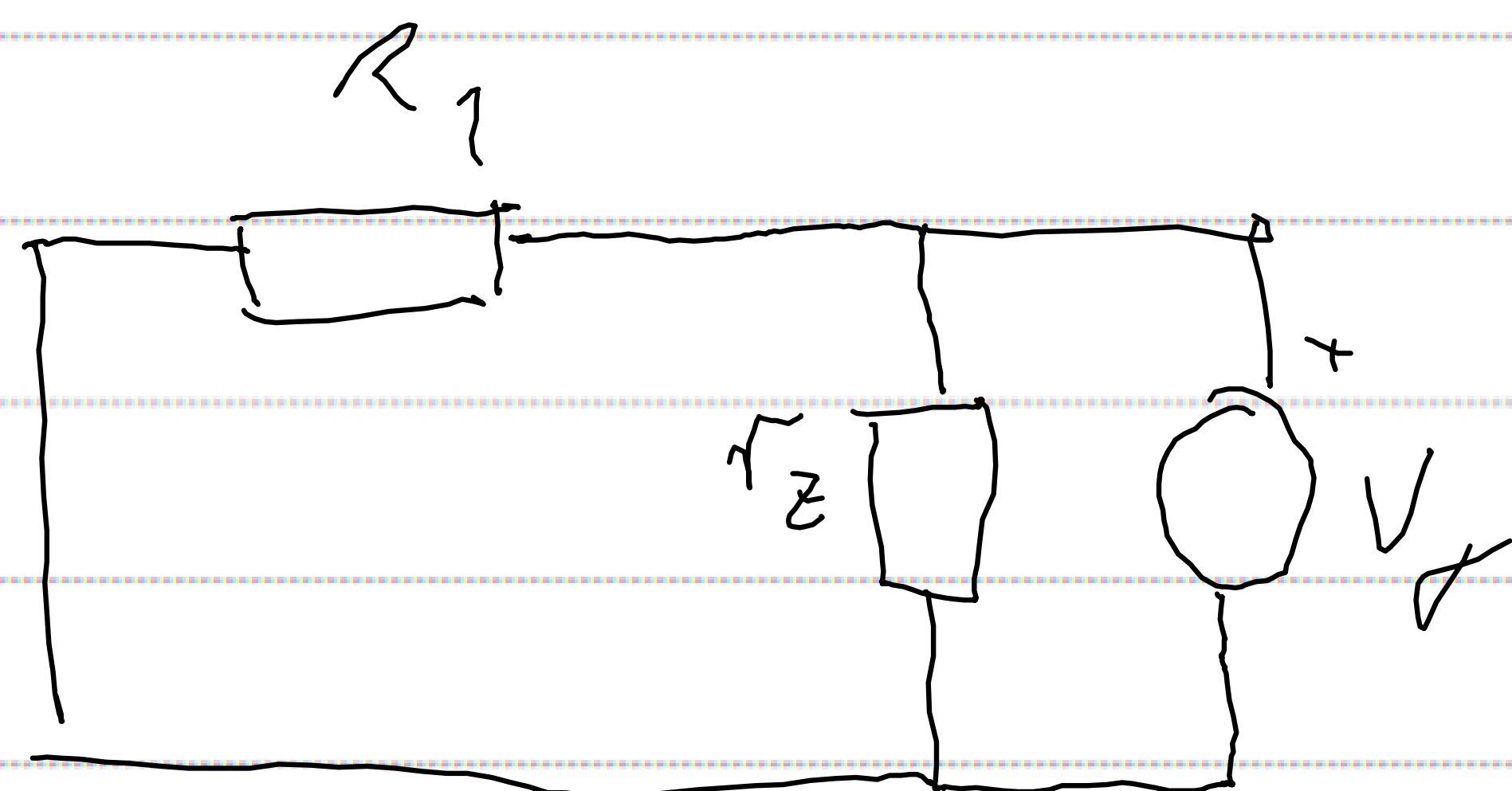
$$i_1 = \frac{U_{VL} - U_Z}{R_1}$$

$$i_{IZ} = \frac{U_{IZ}}{R_T} = \frac{U_Z}{R_T}$$

$$i_Z = i_1 - i_{IZ} = \frac{U_{VL} - U_Z}{R_1} - \frac{U_Z}{R_T}$$

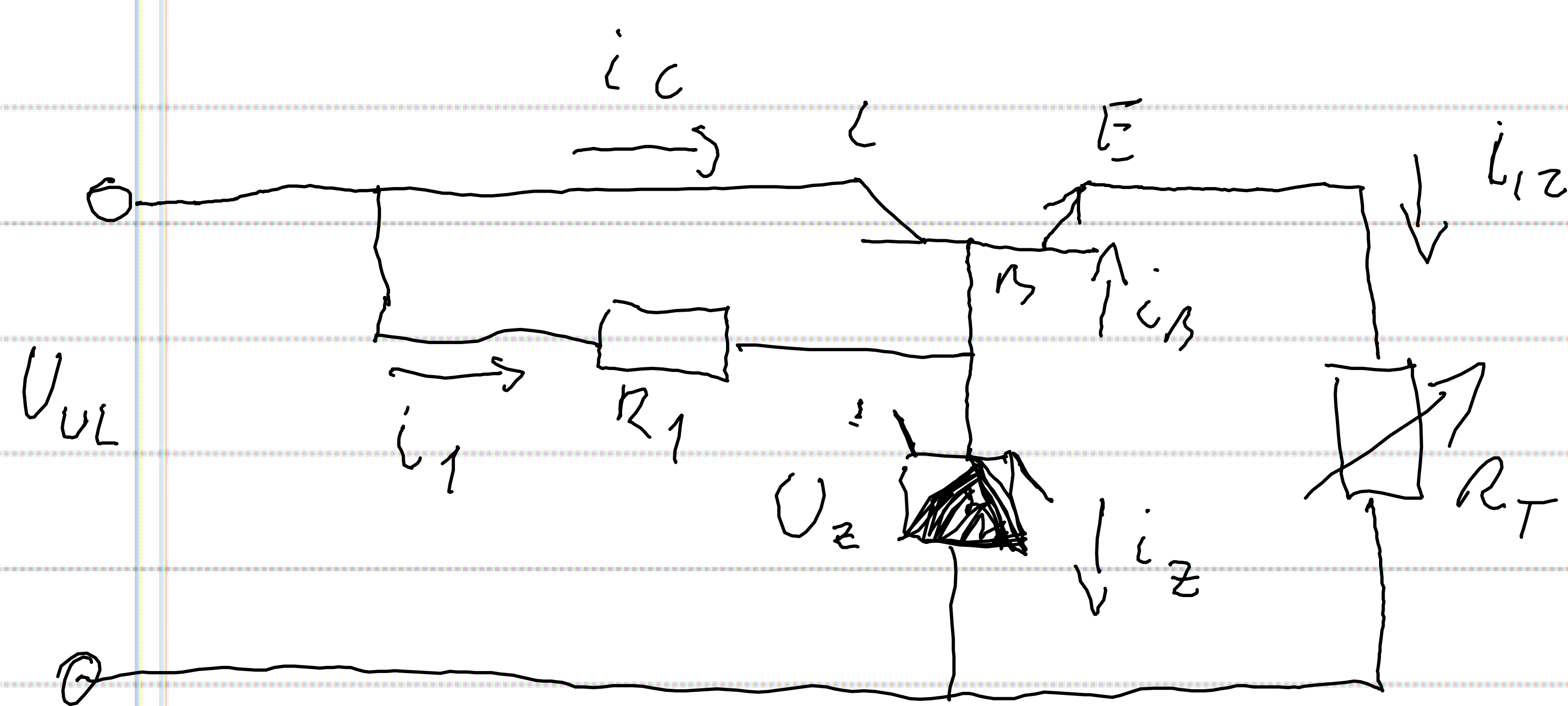
$$i_{Z \min} = \frac{U_{VL \min} - U_Z}{R_{1 \max}} - \frac{U_Z}{R_{T \min}}$$

$$i_{Z \max} = \frac{U_{VL \max} - U_Z}{R_{1 \min}} - \frac{U_Z}{R_{T \max}} = \frac{P_{Z \max}}{U_Z}$$



$$R_{IZ} = R_1 \parallel r_Z$$

$$S_u = \frac{r_Z}{R_1 + r_Z}$$



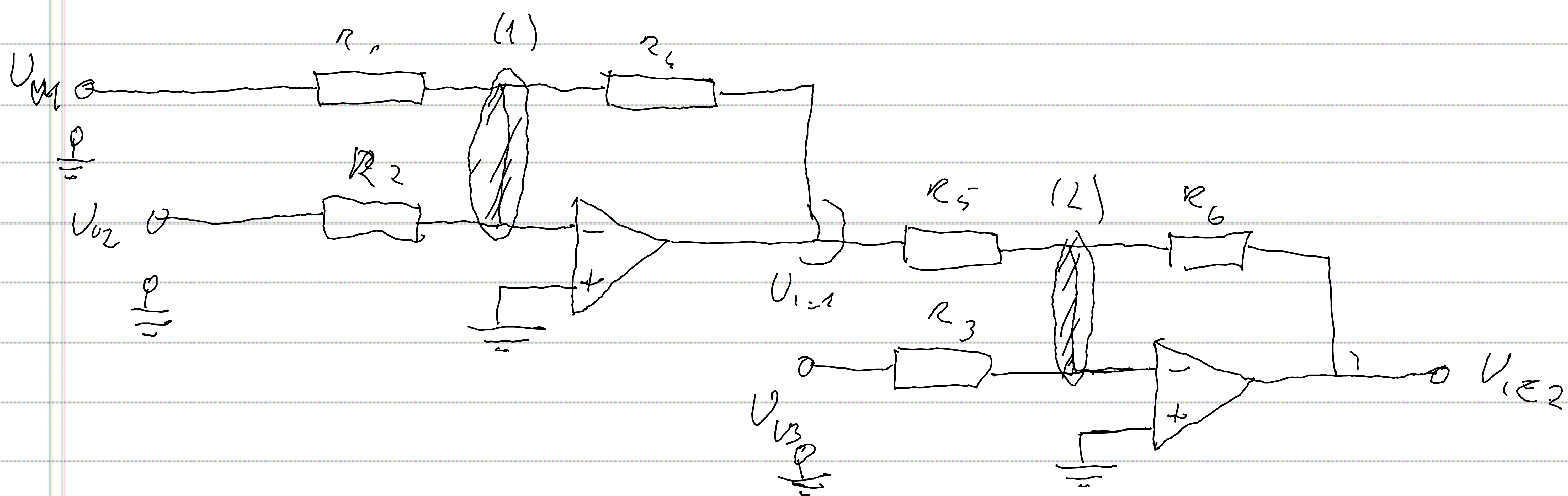
$$i_Z = i_1 - i_L \quad \frac{U_{UL} - U_Z}{R_1} = i_1$$

$$i_{PZ} = (\beta + 1) i_B$$

$$i_B = \frac{i_{PZ}}{\beta + 1} = \frac{U_{PZ}}{(\beta + 1) R_T}$$

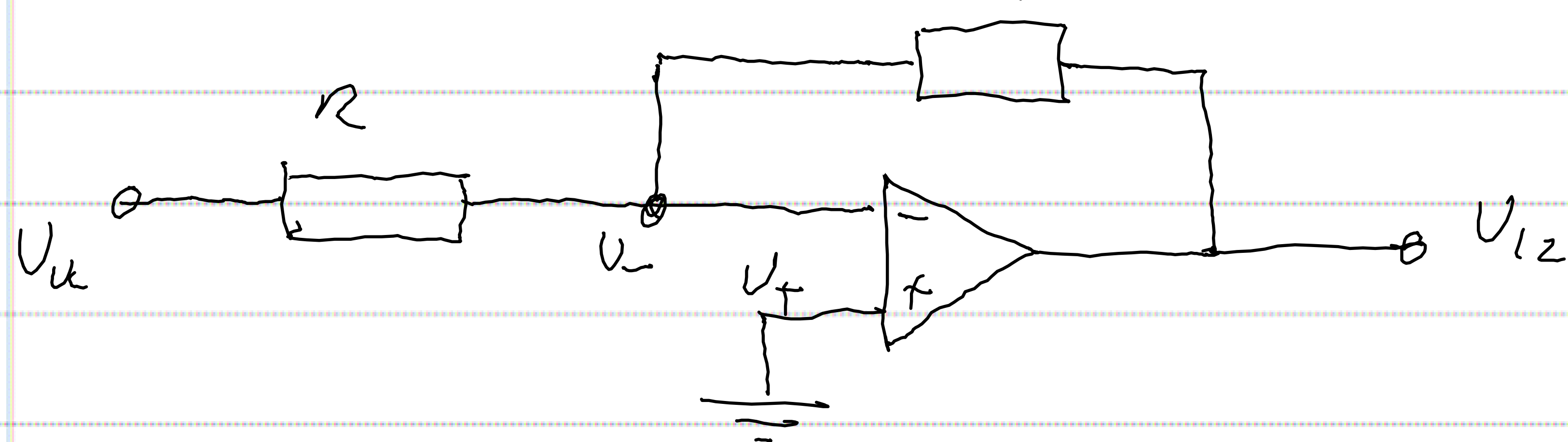
$$U_Z - U_{BE} - U_{PZ} = 0 \quad U_{PZ} = U_Z - U_{BE}$$

OPREDELJENJE POJAČILA



$$(1) \quad U_1 \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_4} \right) = U_{U1} \frac{1}{R_1} + U_{U2} \frac{1}{R_2} + U_{121} \frac{1}{R_4}$$

$$(2) \quad U_2 \left(\frac{1}{R_5} + \frac{1}{R_6} + \frac{1}{R_3} \right) = U_{121} \frac{1}{R_5} + U_{122} \frac{1}{R_6} + U_{U3} \frac{1}{R_3}$$



$$U_- - U_+ = 0 \quad U_- = U_+$$

$$U_1 = 0$$

$$U_{121} = -\frac{R_4}{R_1} U_{U1} - \frac{R_4}{R_2} U_{U2}$$

$$U_2 = 0$$

$$U_{122} = -\frac{R_6}{R_5} U_{121} - \frac{R_6}{R_3} U_{U3}$$