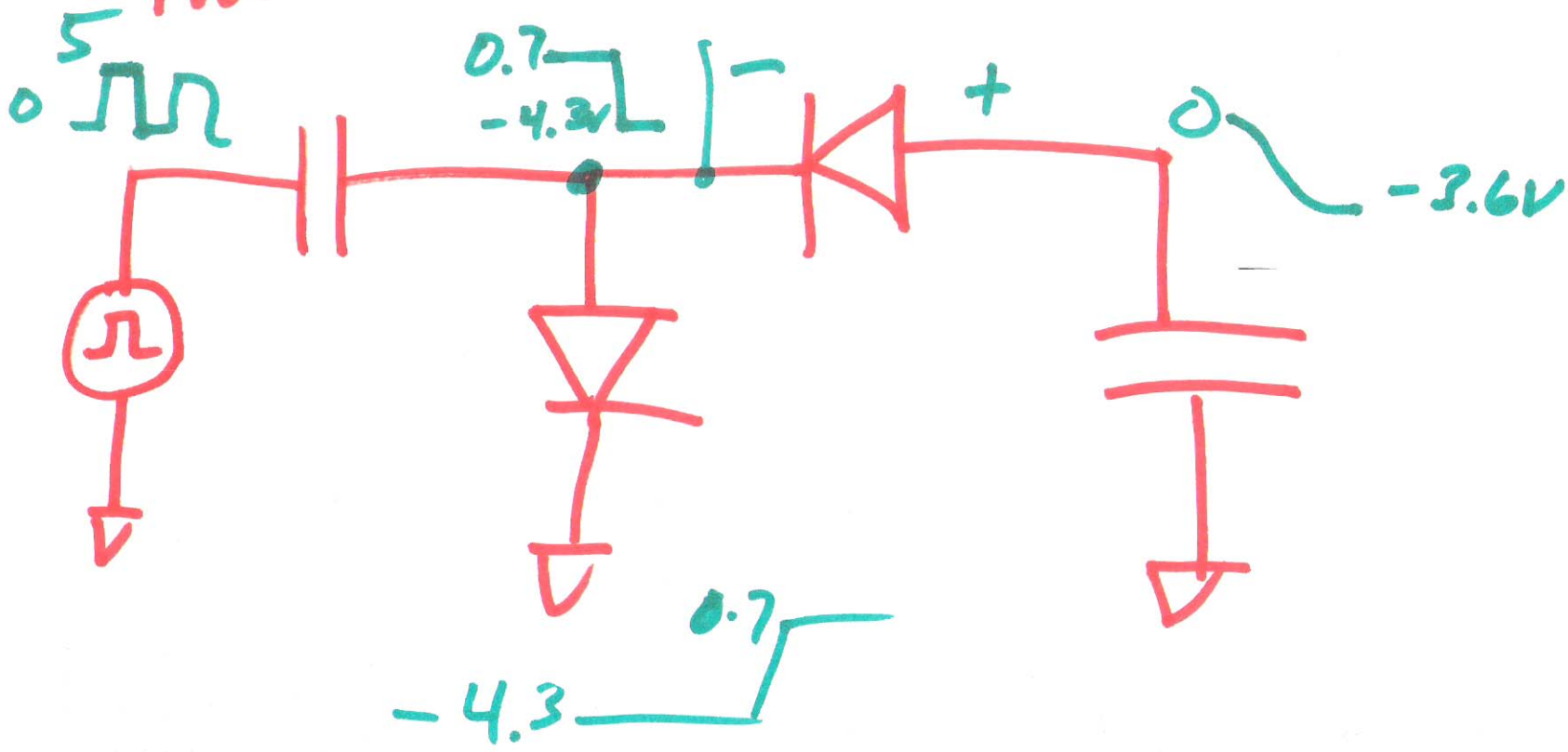
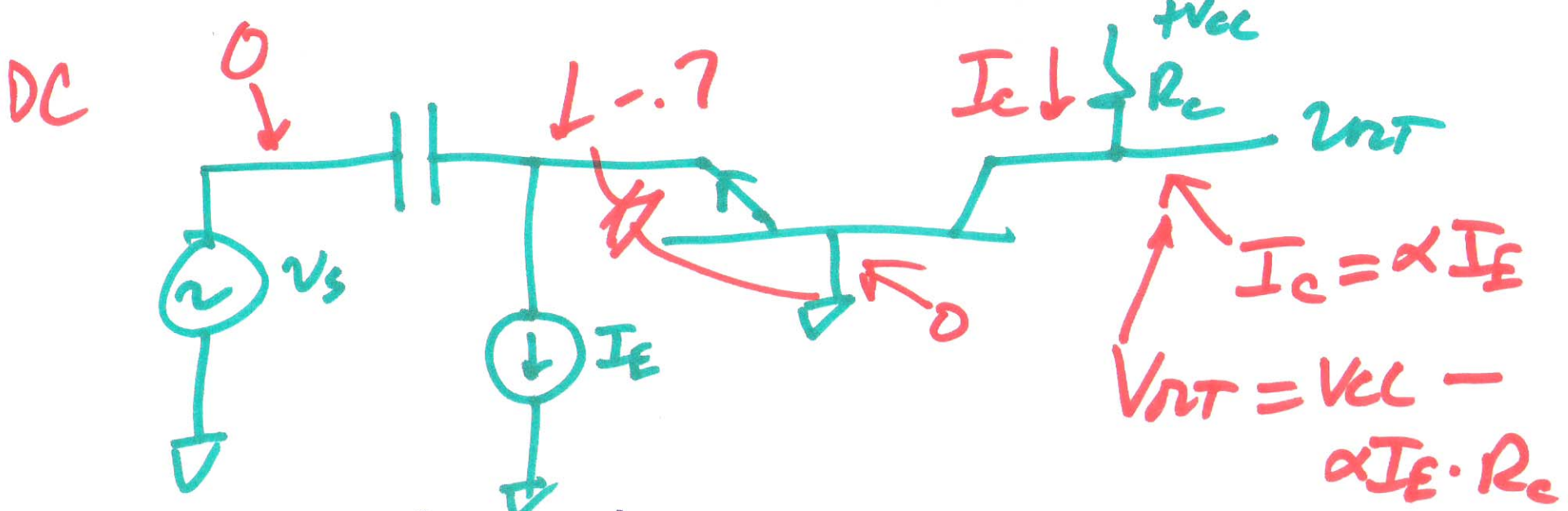
EE 320, Electronics I

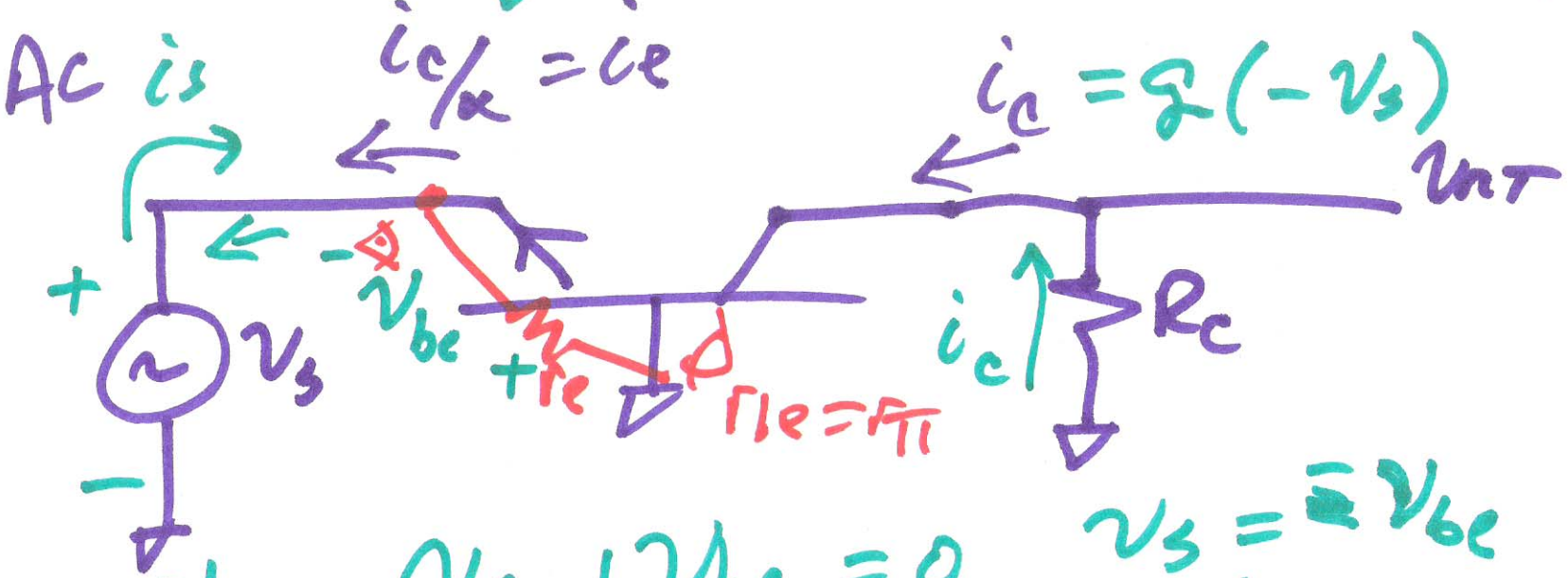
Lecture 28

May 6, 2015

More review for final







$$\frac{v_s}{i_s} = \frac{-v_{be}}{-i_e}$$

$$v_s + v_{be} = 0$$

$$v_s = -v_{be}$$

$$\frac{v_{out}}{v_s} = \frac{-i_c \cdot R_c}{-i_c/g_m} = g_m R_c$$

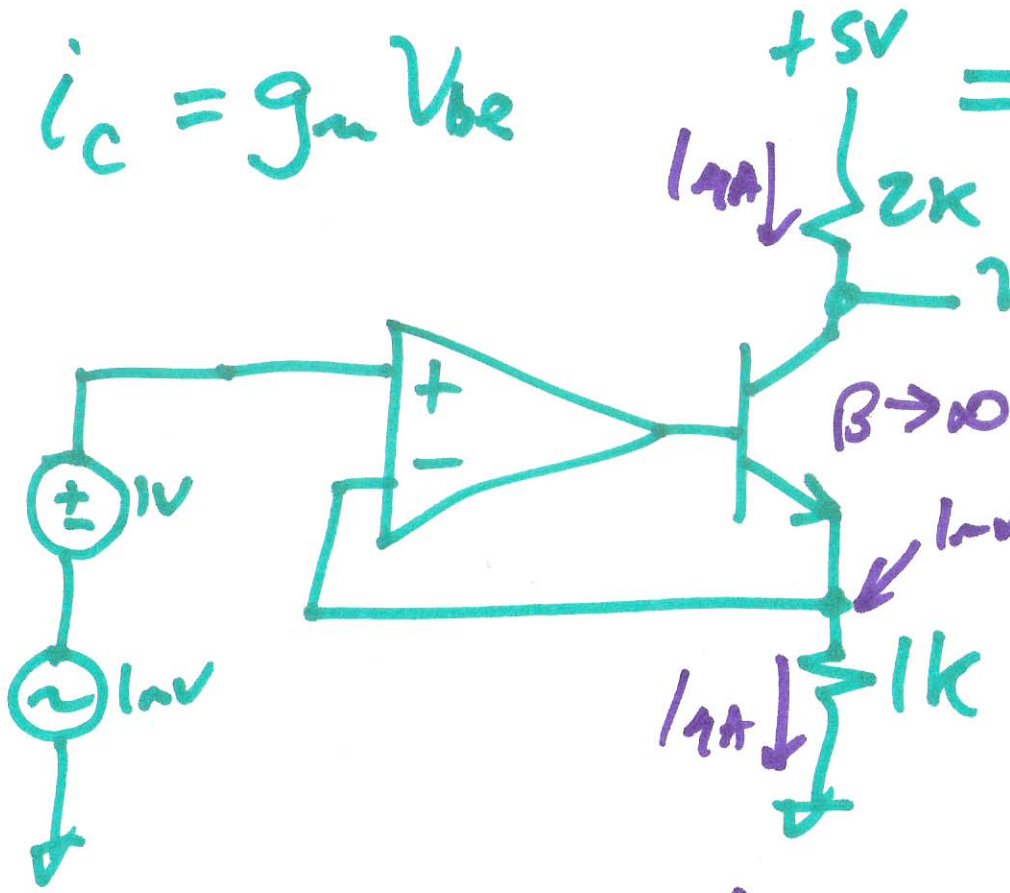
$$R_{IN} = \frac{v_s}{i_s} = \frac{-v_{be}}{-i_e} = \frac{i_c/g_m}{i_c/\alpha} = \frac{\alpha}{g_m}$$

$$i_C = g_m v_{be}$$

$$= \frac{\alpha}{\frac{I_C}{NV_T}} = \frac{NV_T}{I_C/\alpha}$$

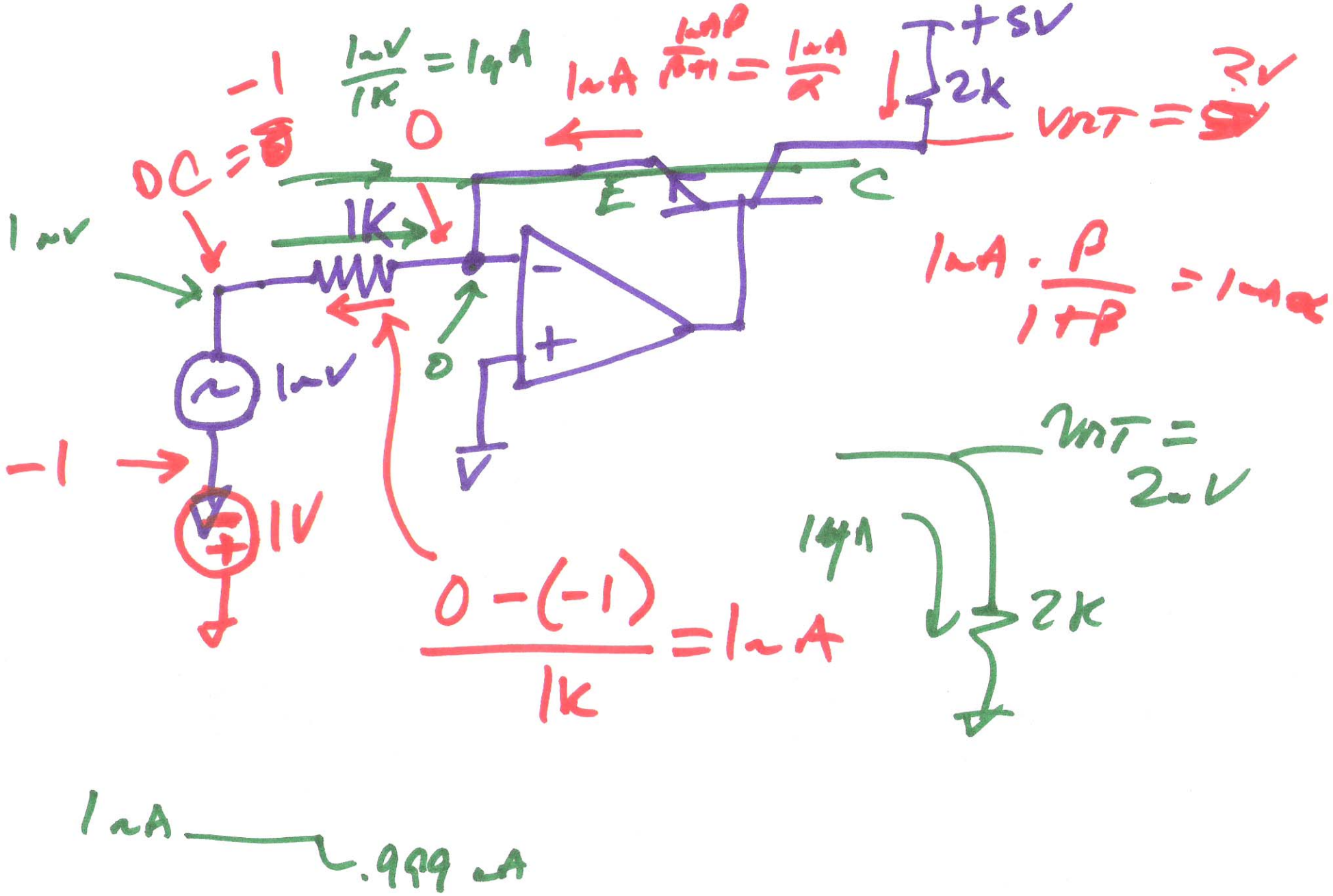
$$= \frac{NV_T}{I_E}$$

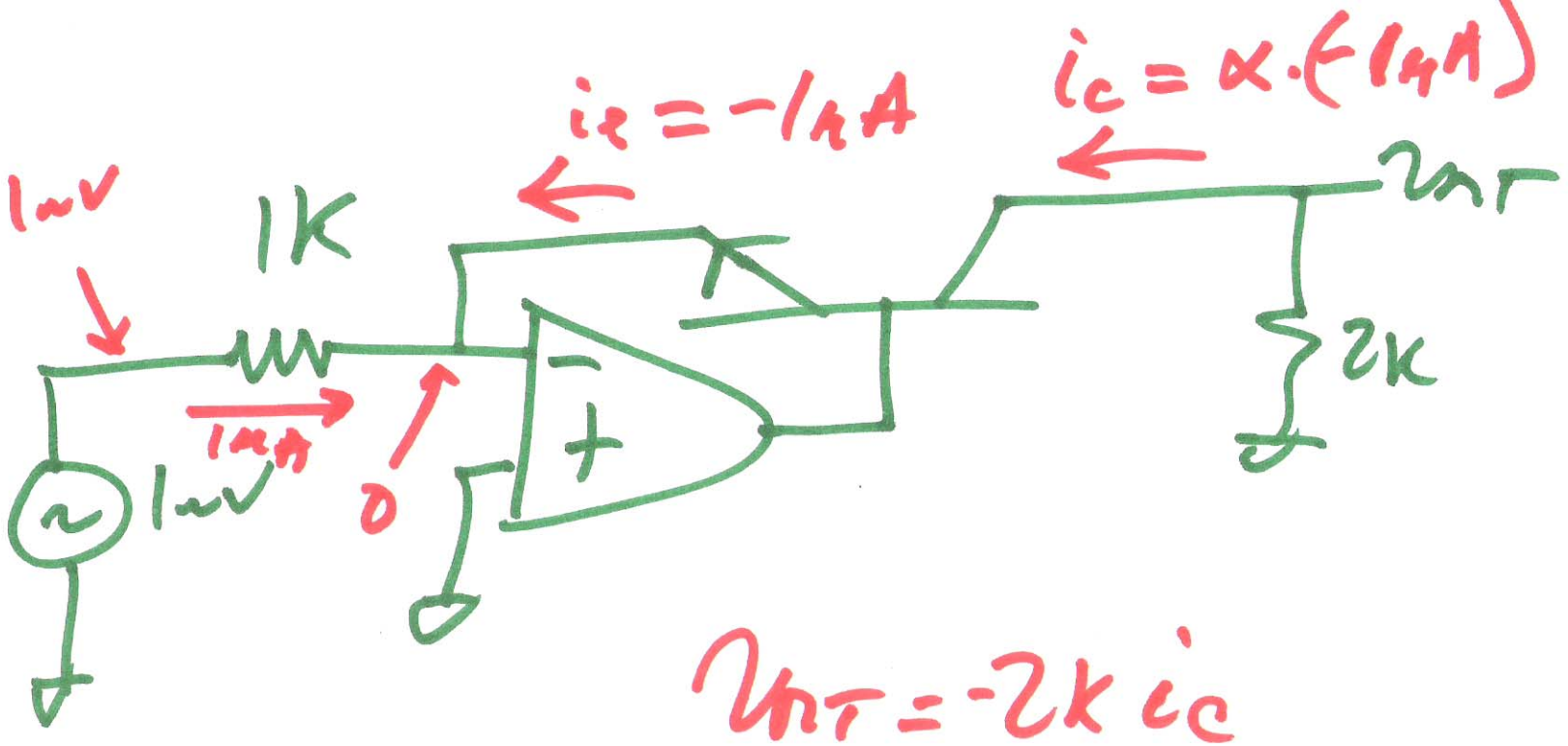
$$= r_e$$



$$\frac{1mV}{1K} = 1mA$$

$$v_{out} = -1mA \cdot 2K = -2mV$$


-1
1mV/1K = 1mA
1mA
1mA·β/(1+β) = 1mA
+5V
2K
VOUT = 2V
OC
E
C
1K
1mV
1mA·β/(1+β) = 1mA·α
0
1mV
-1
1V
0 - (-1)/1k = 1mA
VOUT = 2mV
1mA
2K
1mA
.999 mA



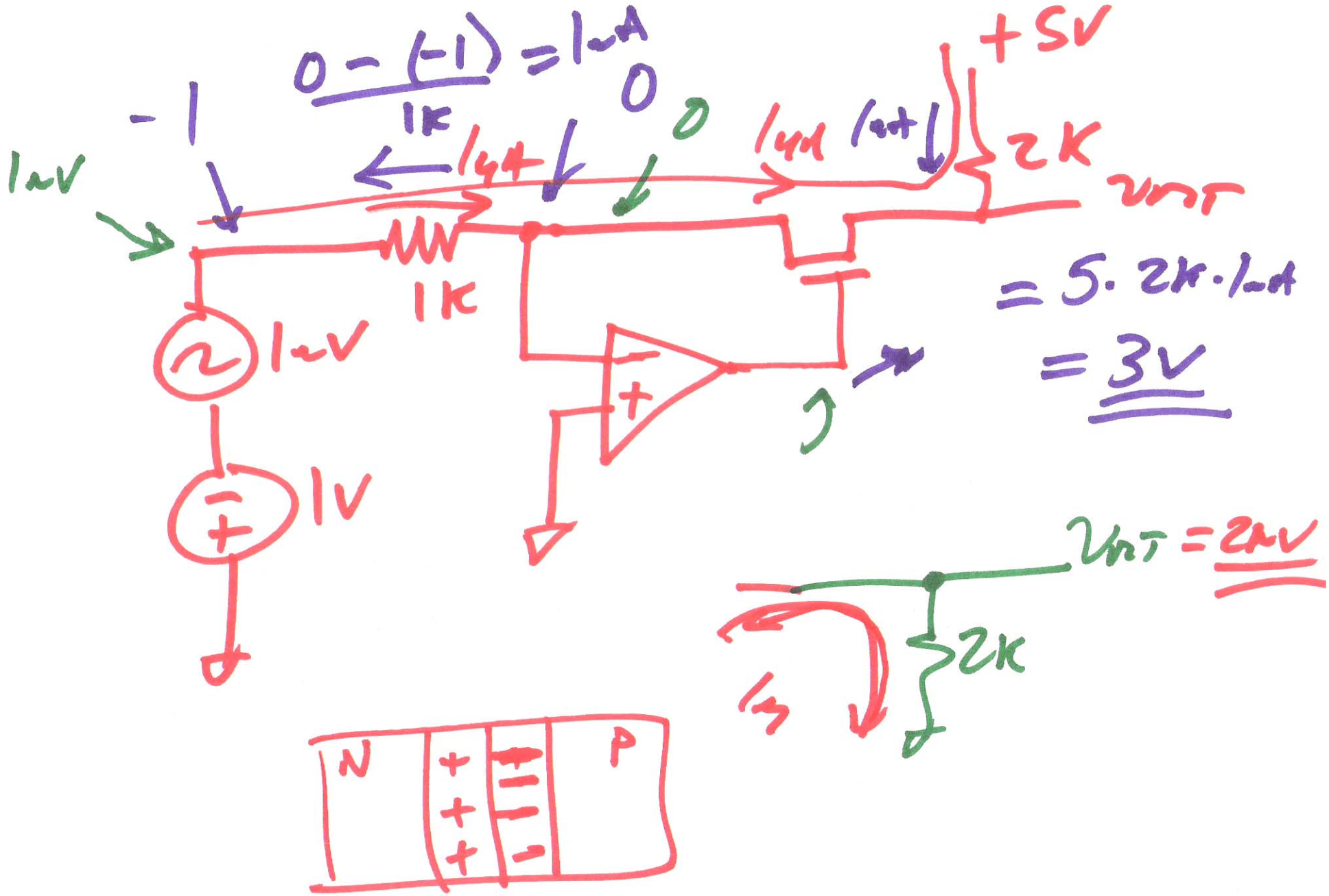
$i_E = -1\text{mA}$

$i_C = \alpha \cdot (-1\text{mA})$

$v_{out} = -2k\, i_C$

$= 2k \cdot \alpha \cdot 1\text{mA}$

$\simeq \underline{\underline{2\text{mV}}}$


0 − (−1) = 1mA
1K
−1
0
+5V
1mV
1mA
2K
1K
1mV
1V
= 5. 2K · 1mA
= 3V
$V_{out} = 2mV$
2K
I_x
N
P