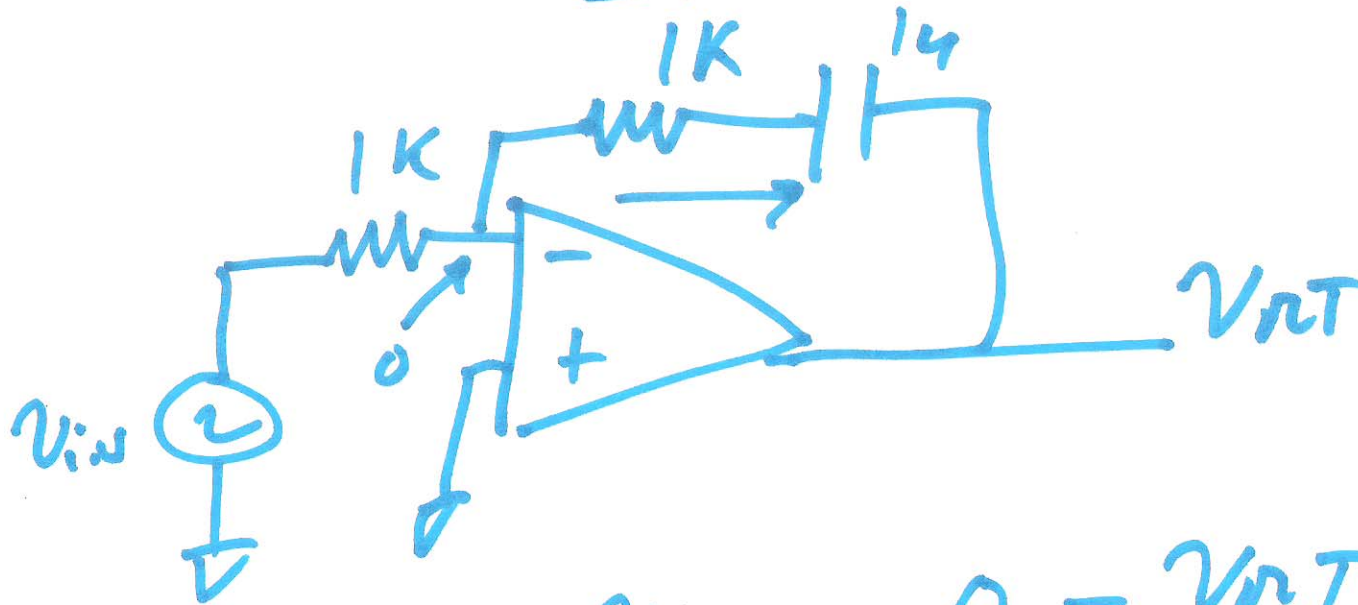


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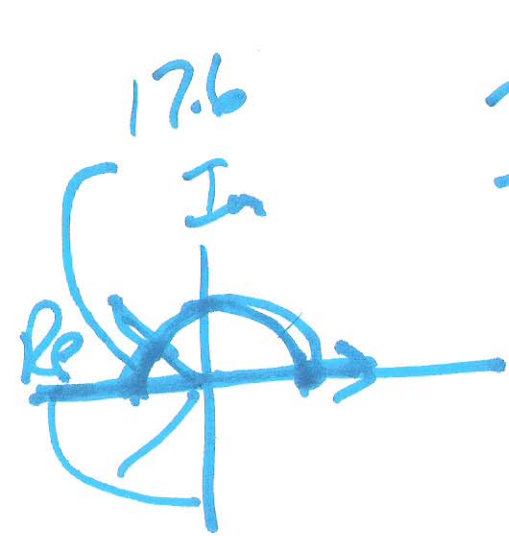
LPC fine 5



$$\frac{v_{in}}{1K} = \frac{0 - v_{out}}{1K + \frac{1}{j\omega 10^{-6}}}$$

$$\frac{v_{out}}{v_{in}} = \frac{-(1K + \frac{1}{j\omega 10^{-6}})}{1K}$$

))



$$\frac{v_{out}}{v_{in}} = - \left(1 + \frac{1}{j2\pi f 10^{-3}} \right)$$

$$= -1 + j \cdot \frac{159}{f}$$

$$\left| \frac{v_{out}}{v_{in}} \right| = \sqrt{1 + \left(\frac{159}{f} \right)^2}$$

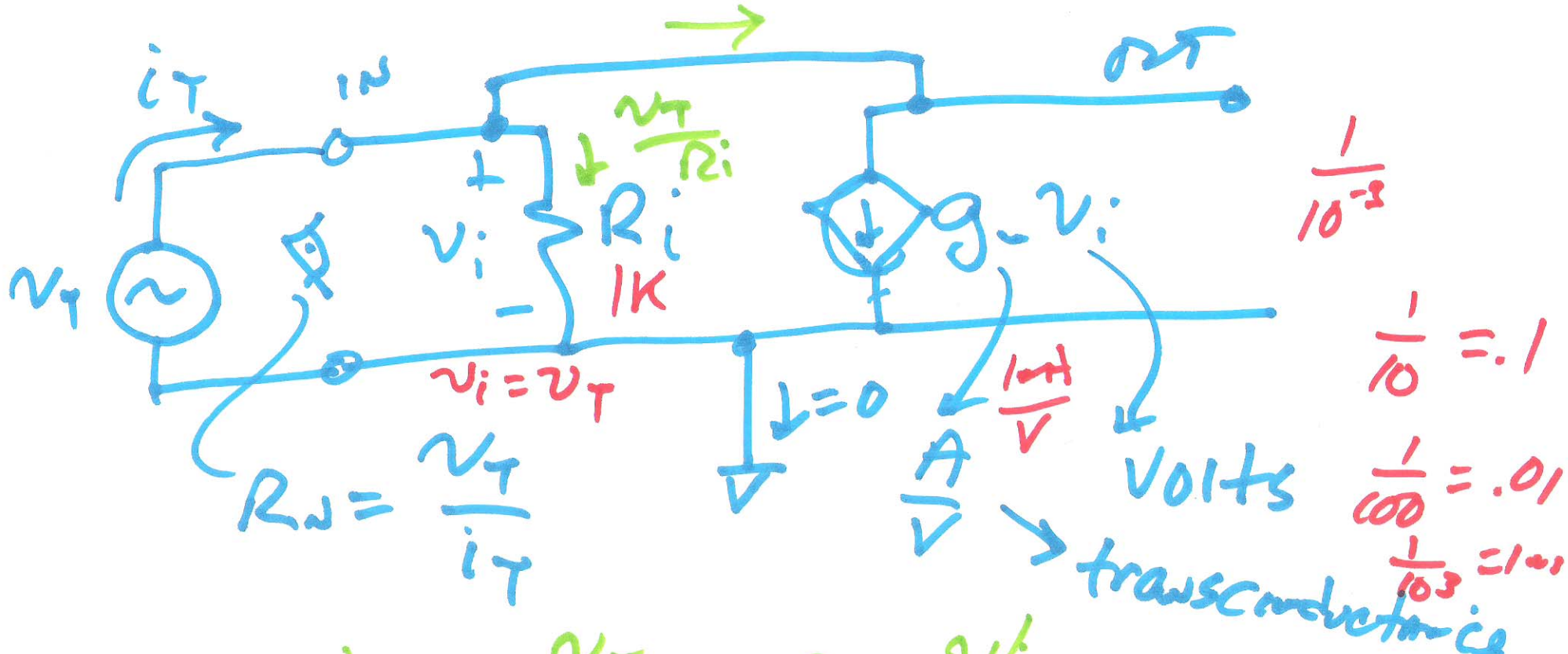
$$\angle \frac{v_{out}}{v_{in}} = \tan^{-1} \frac{159}{-1} = -\tan^{-1} \frac{159}{1}$$

$$\frac{t_d}{T} \cdot 360 = t_d \cdot f \cdot 360 = -17.6^\circ$$

$$t_d = \frac{17.6}{360} \cdot \frac{1}{500}$$

$$\approx 100 \mu s$$

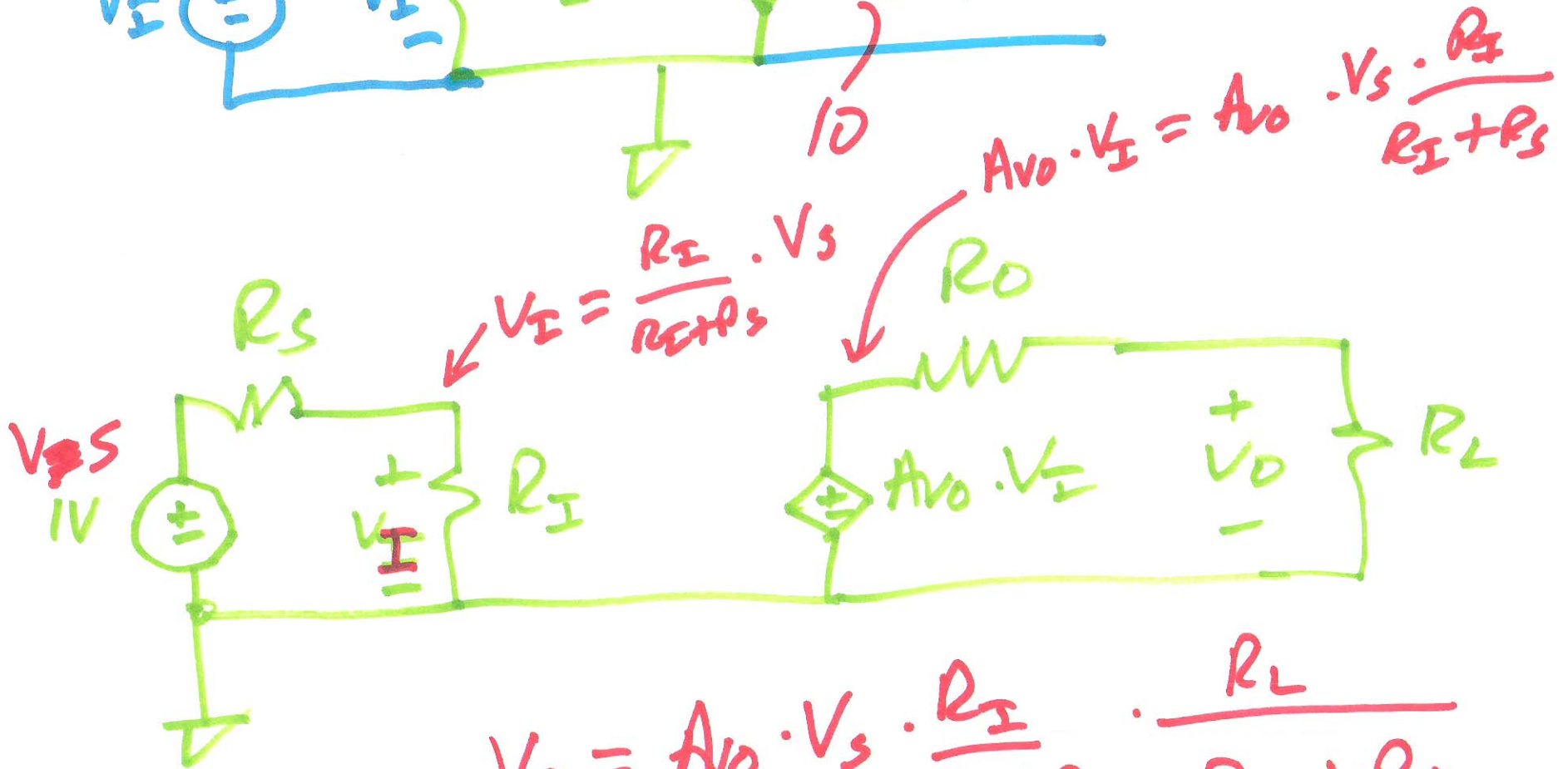
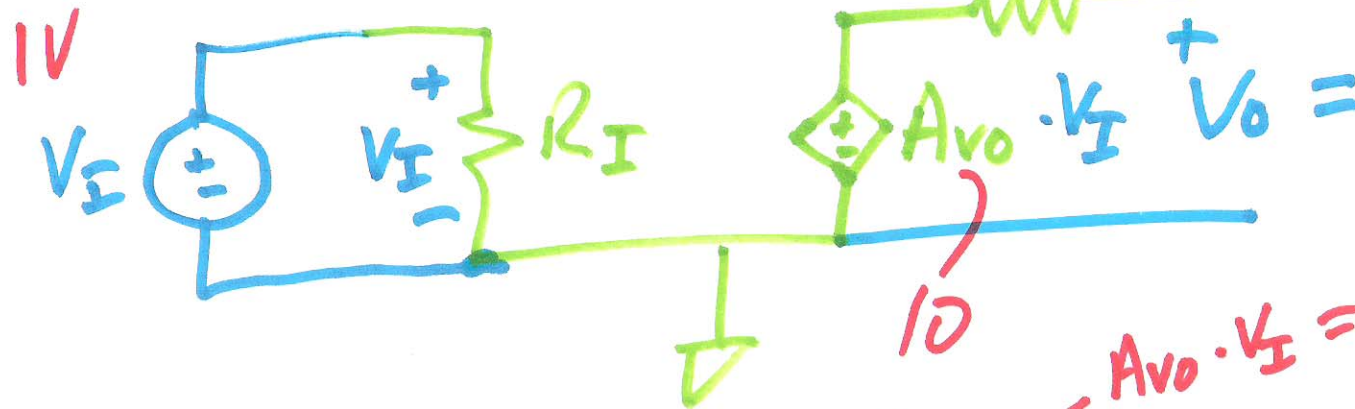
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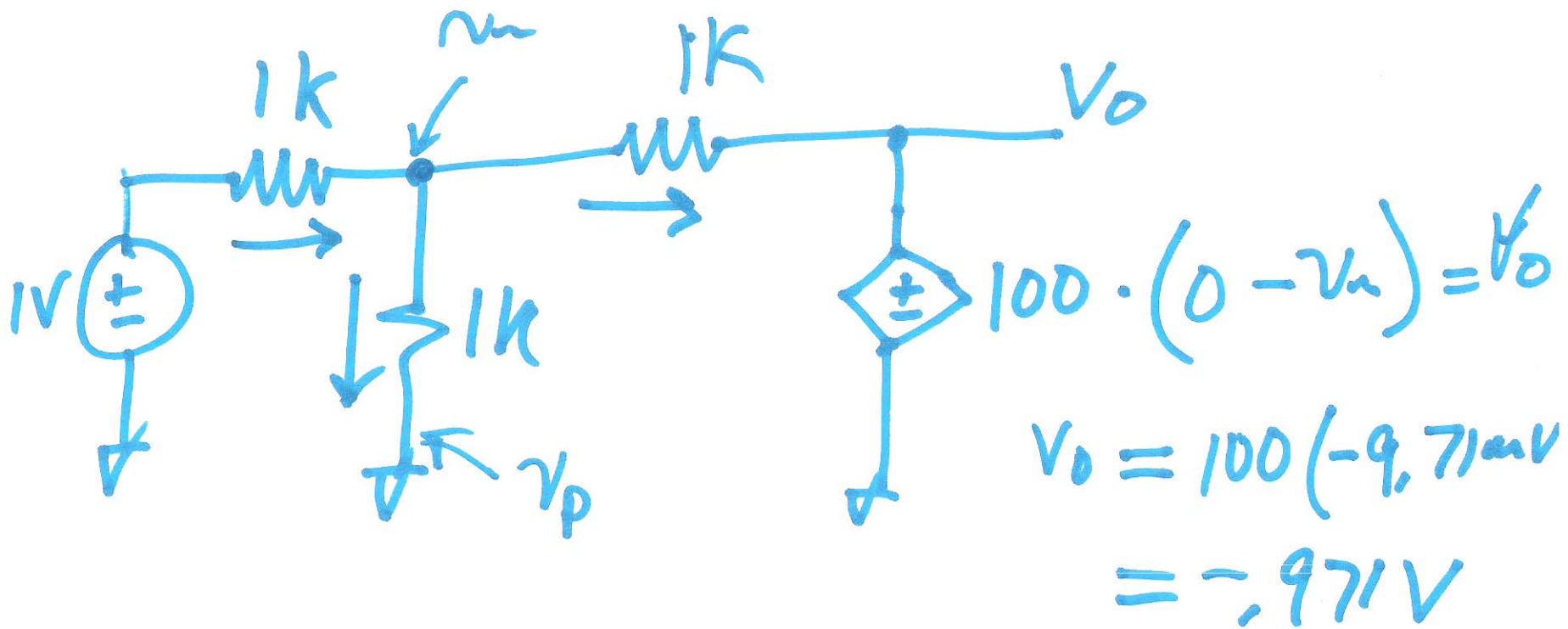
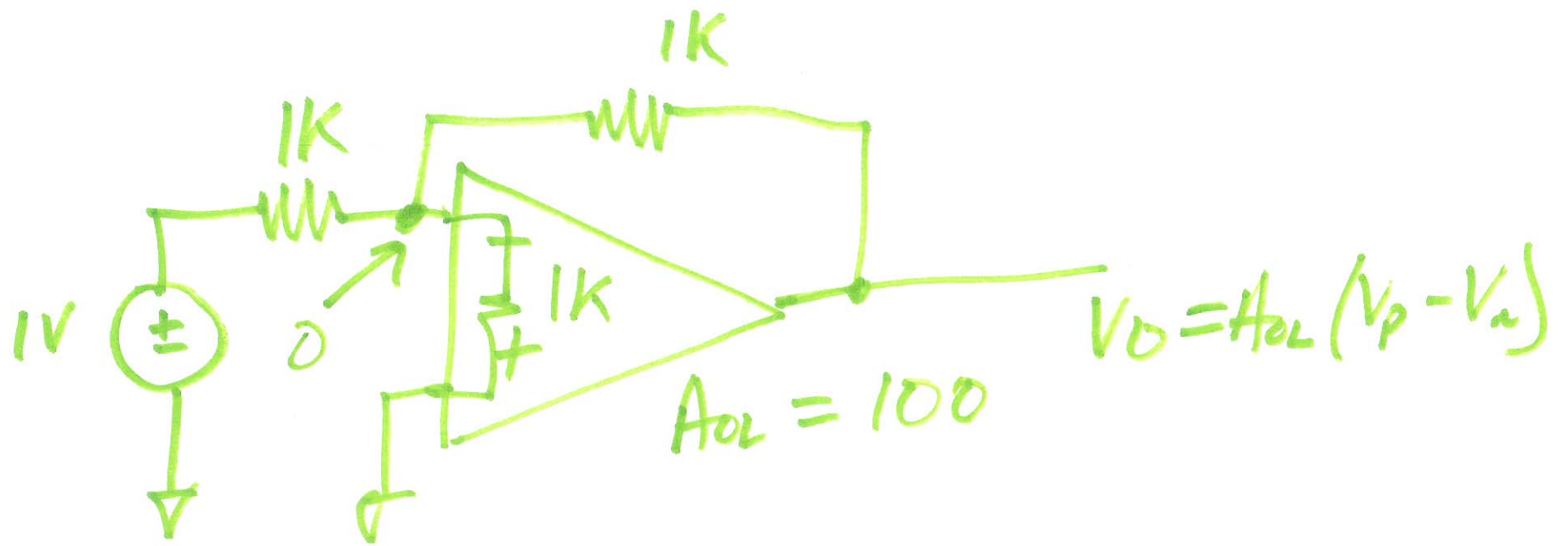
$$i_T = \frac{v_T}{R_i} + g_m \frac{v_i}{v_T}$$

$$i_T = v_T \left(\frac{1}{R_i} + g_m \right)$$

$$\frac{v_T}{i_T} = \frac{1}{\frac{1}{R_i} + \frac{1}{g_m}} = R_i \parallel \frac{1}{g_m}$$



$$V_o = A_{vo} \cdot V_s \cdot \frac{R_I}{R_I + R_s} \cdot \frac{R_L}{R_L + R_o}$$



5)

$$\frac{1 - v_m}{1k} = \frac{v_m}{1k} + \frac{v_m - (-100v_m)}{1k}$$

$$1 = 2v_m + v_m + 100v_m$$

$$v_m = \frac{1}{103} = 9.71 \mu V$$

$$V_o = -0.971 V \\ = -971 \mu V$$