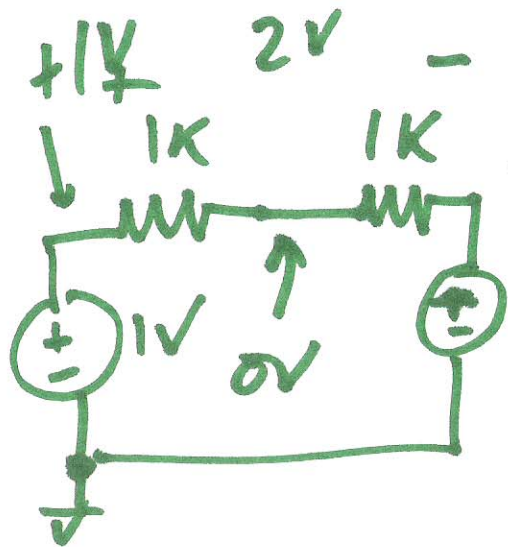


June 16, 2014

Lecture 4D

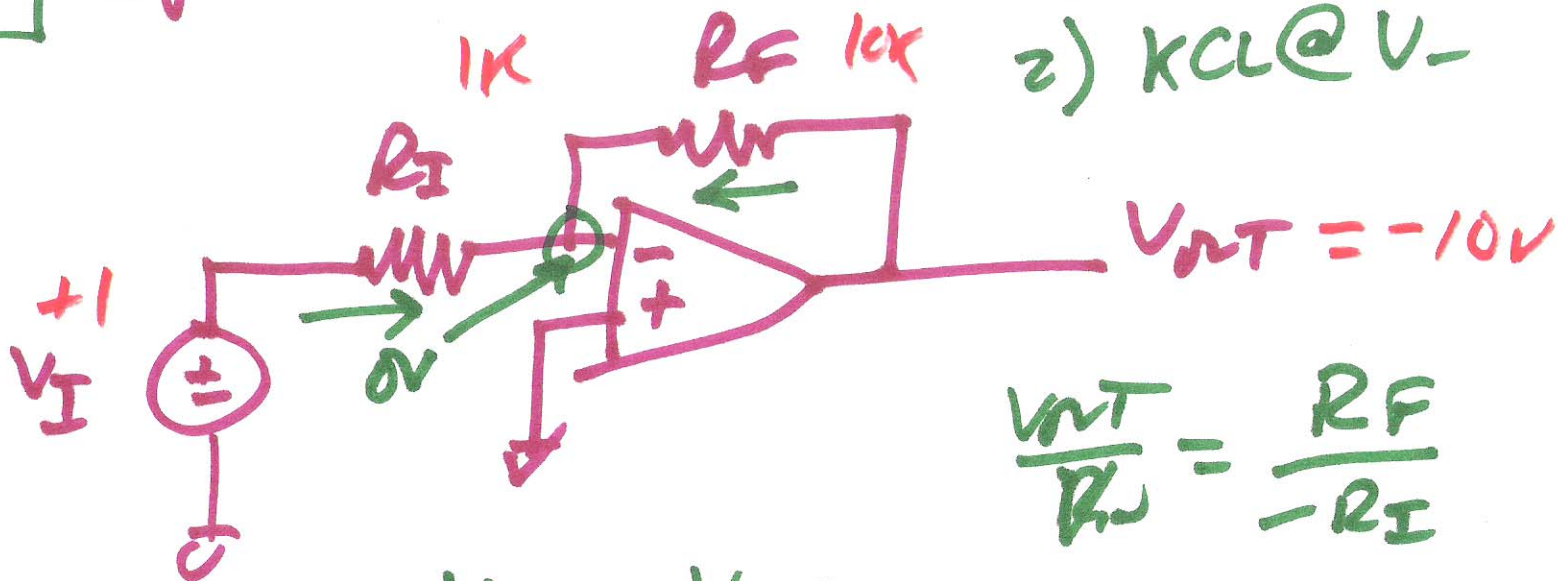
EE 220D



Op Amp DS

1) $V_+ = V_-$

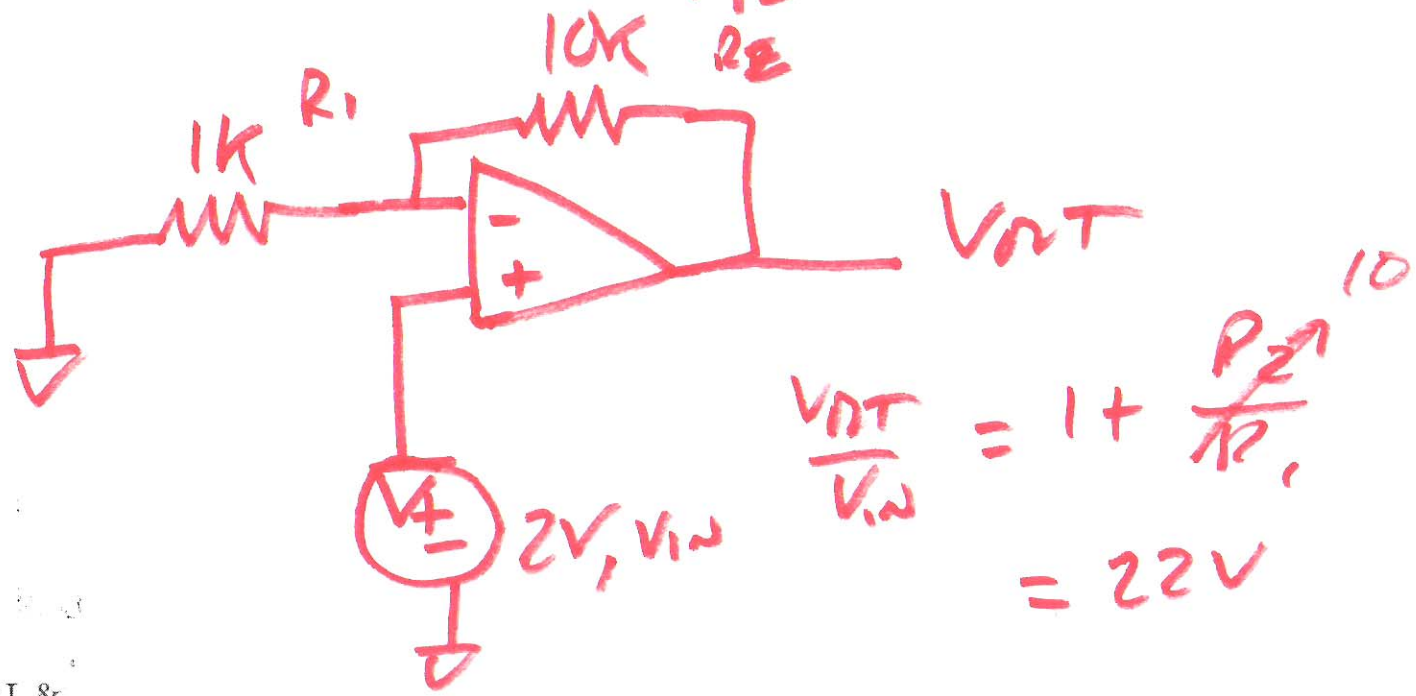
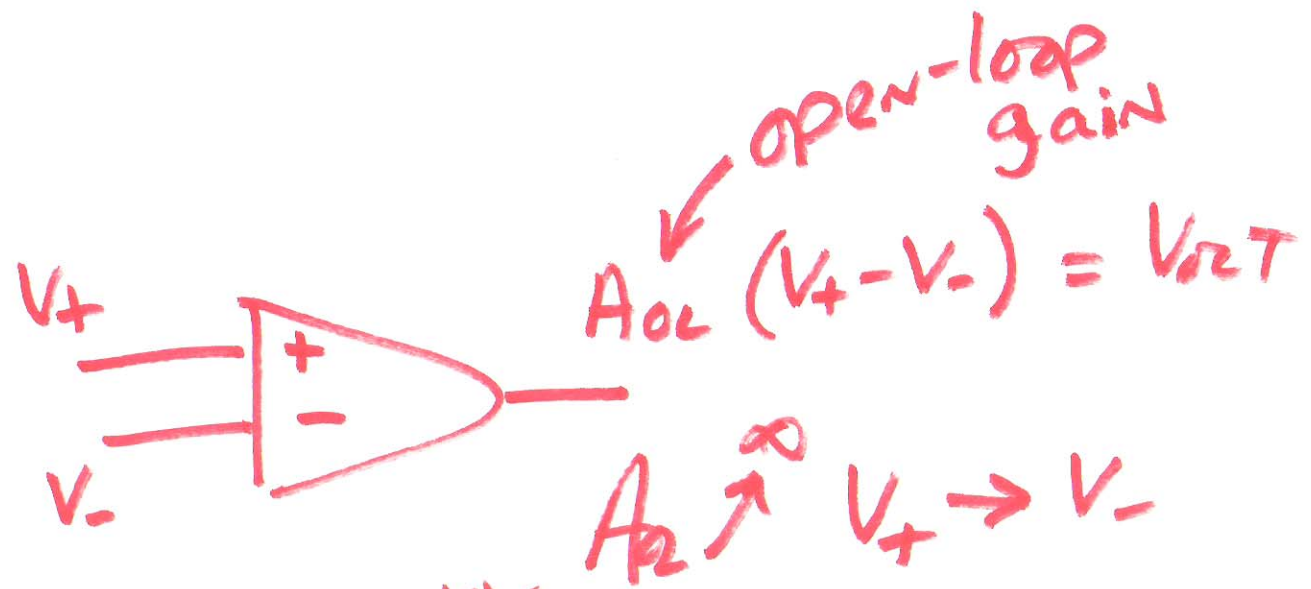
2) KCL @ V_-



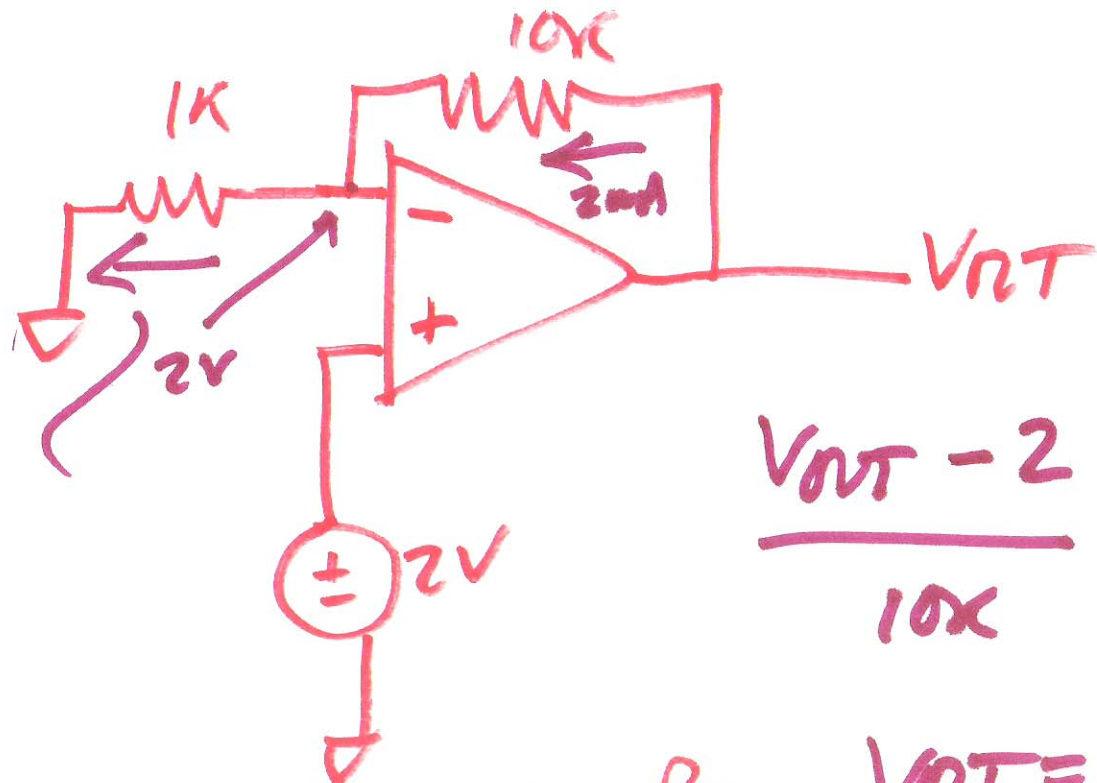
$$\frac{V_{OUT}}{R_F} = \frac{R_I}{-R_I}$$

$$\frac{V_I}{R_I} + \frac{V_{OUT}}{R_F} = 0$$

1)



2)

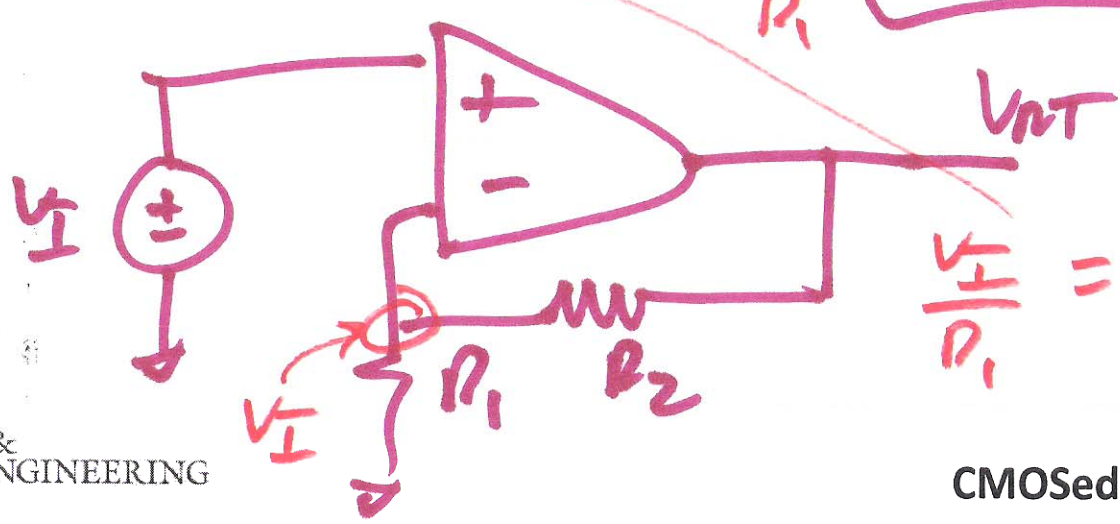
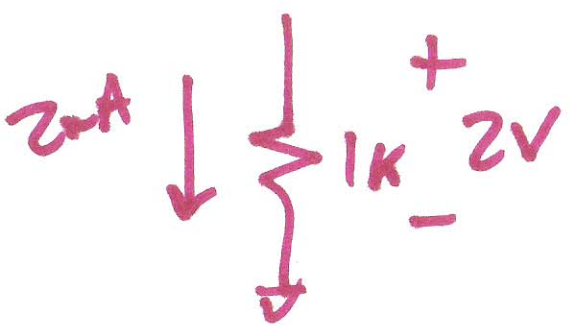


$$\frac{V_{out} - 2}{10k} = 2mA$$

$$V_{out} = 20 + 2$$

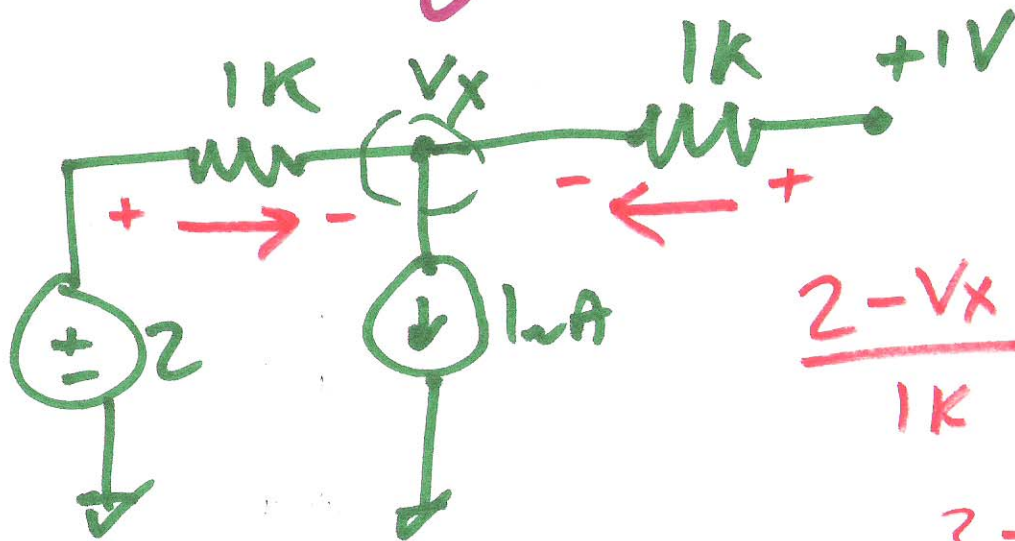
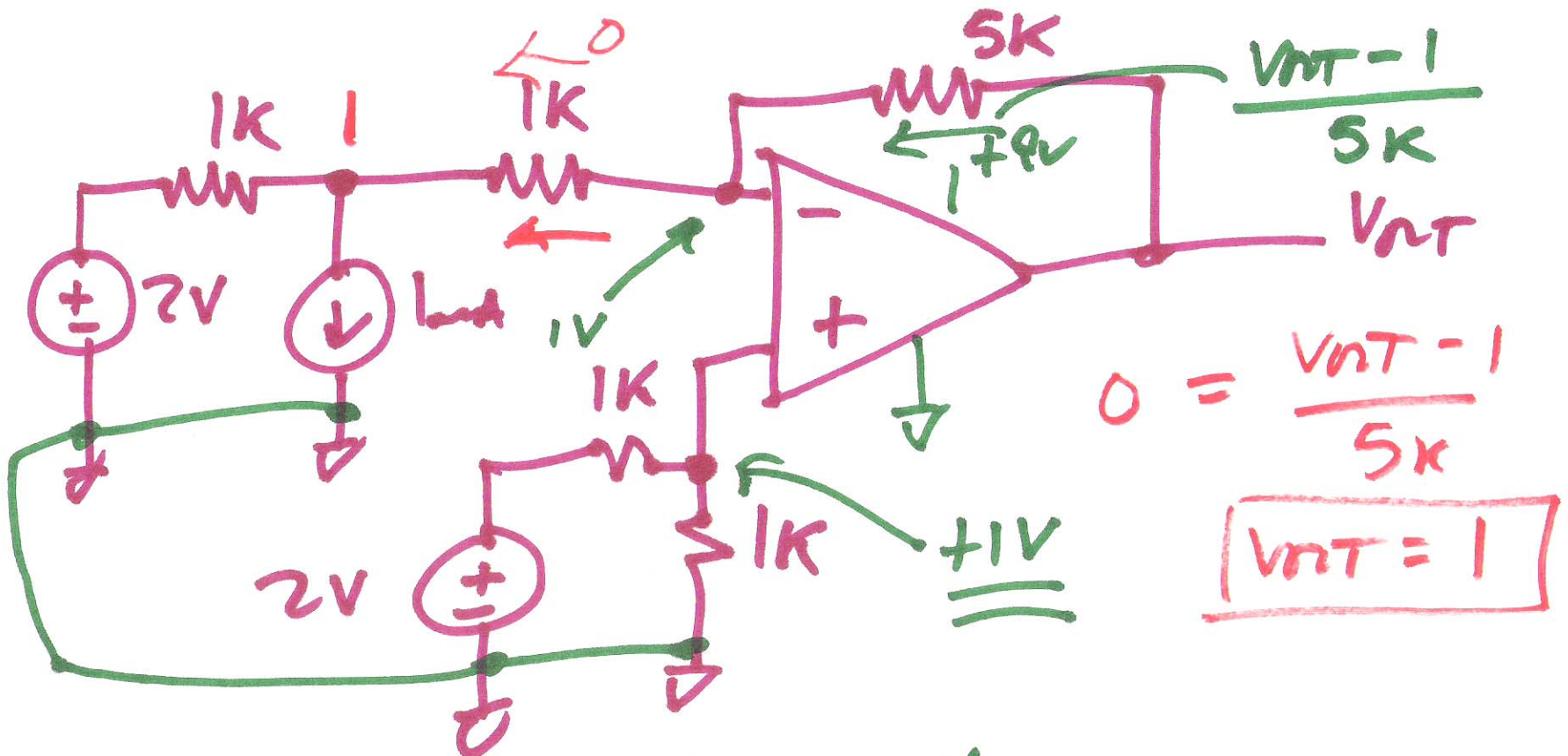
$V_{out} = 22$

$$\frac{V_{out}}{V_I} = 1 + \frac{R_2}{R_1} = \frac{R_1 + R_2}{R_1}$$



$$\frac{V_I}{R_1} = \frac{V_{out} - V_I}{R_2}$$

3)



$$\frac{2 - V_X}{1K} + \frac{1 - V_X}{1K} = 1 \text{ mA}$$

$$3 - 2V_X = 1 \quad \boxed{V_X = 1}$$

4)