

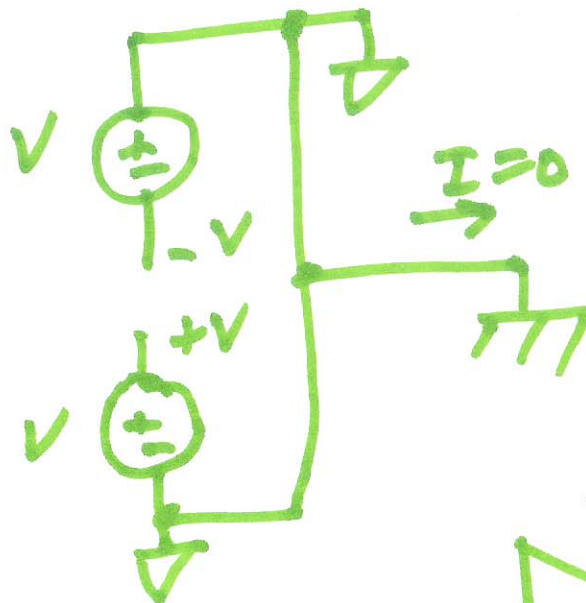
EE 320

Lecture 6

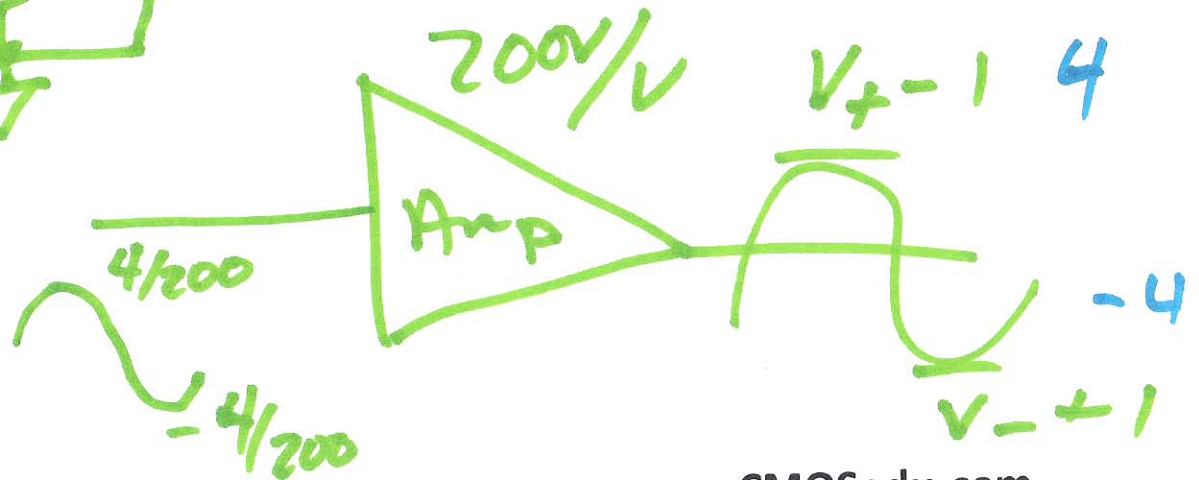
Electronics I

Feb. 4, 2015

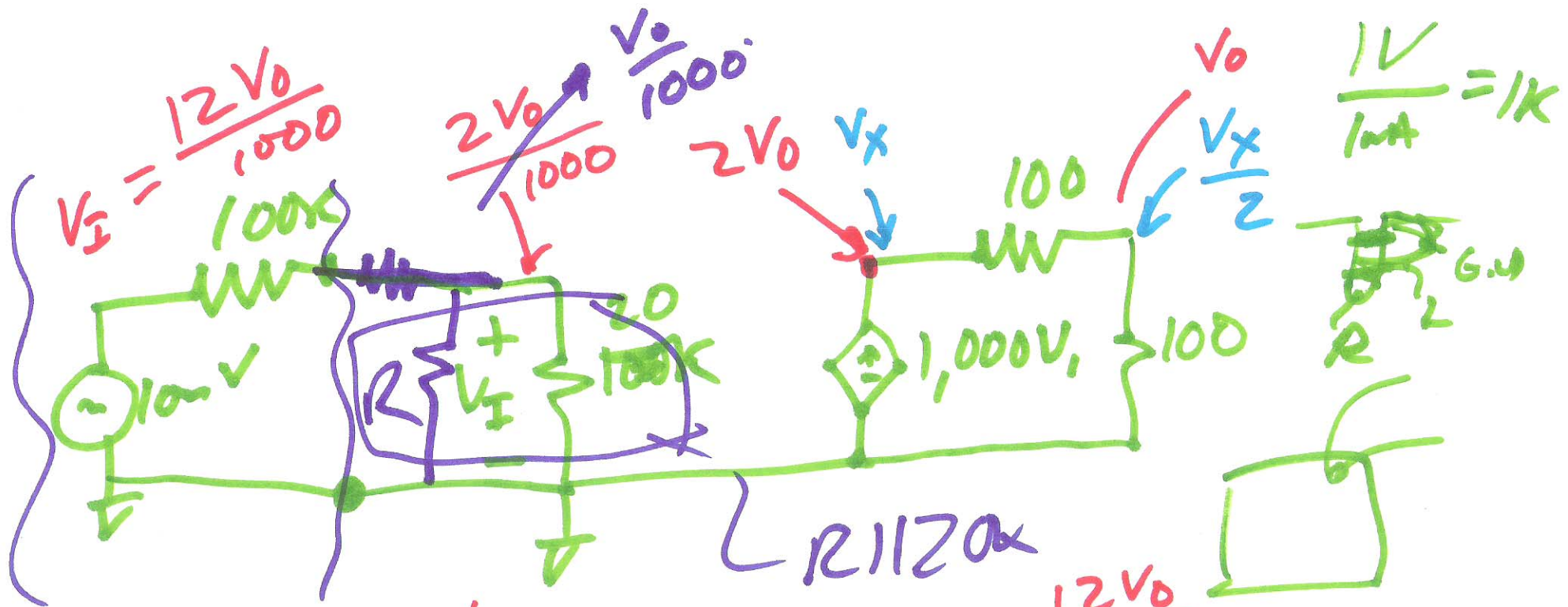
1.41



$$R_{ms} = \frac{4}{\sqrt{2}}$$



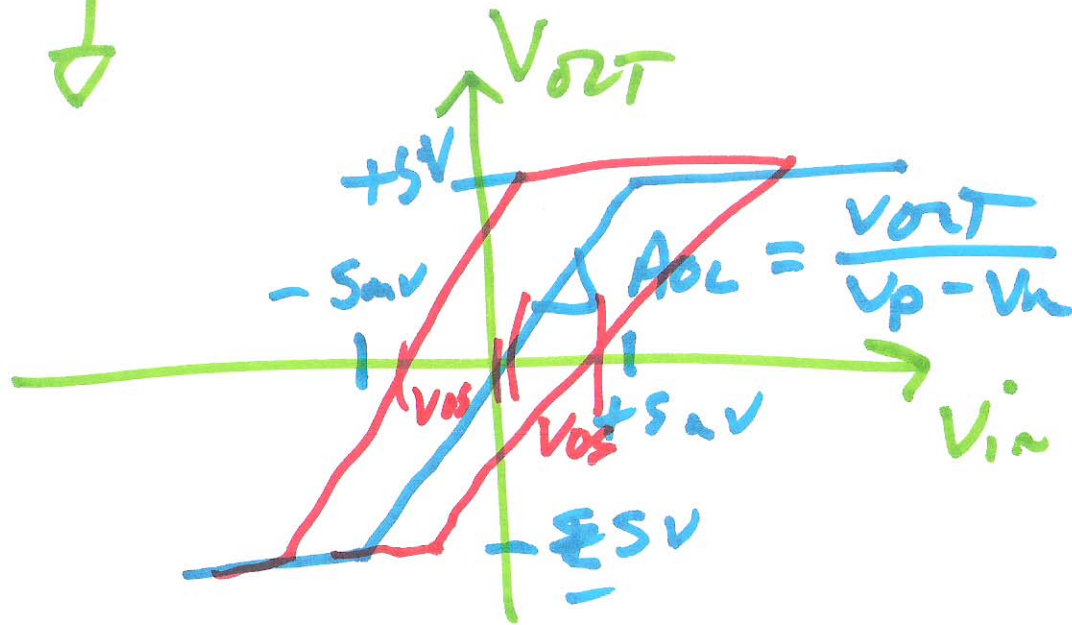
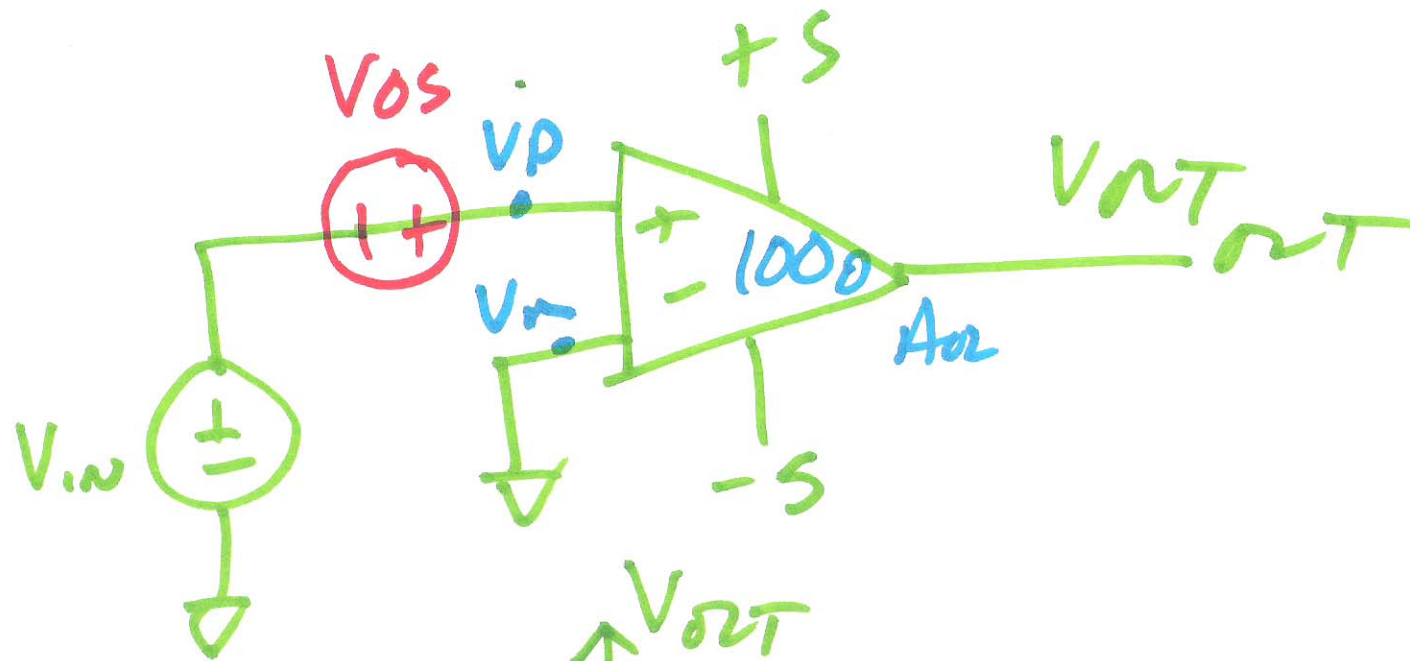
1)



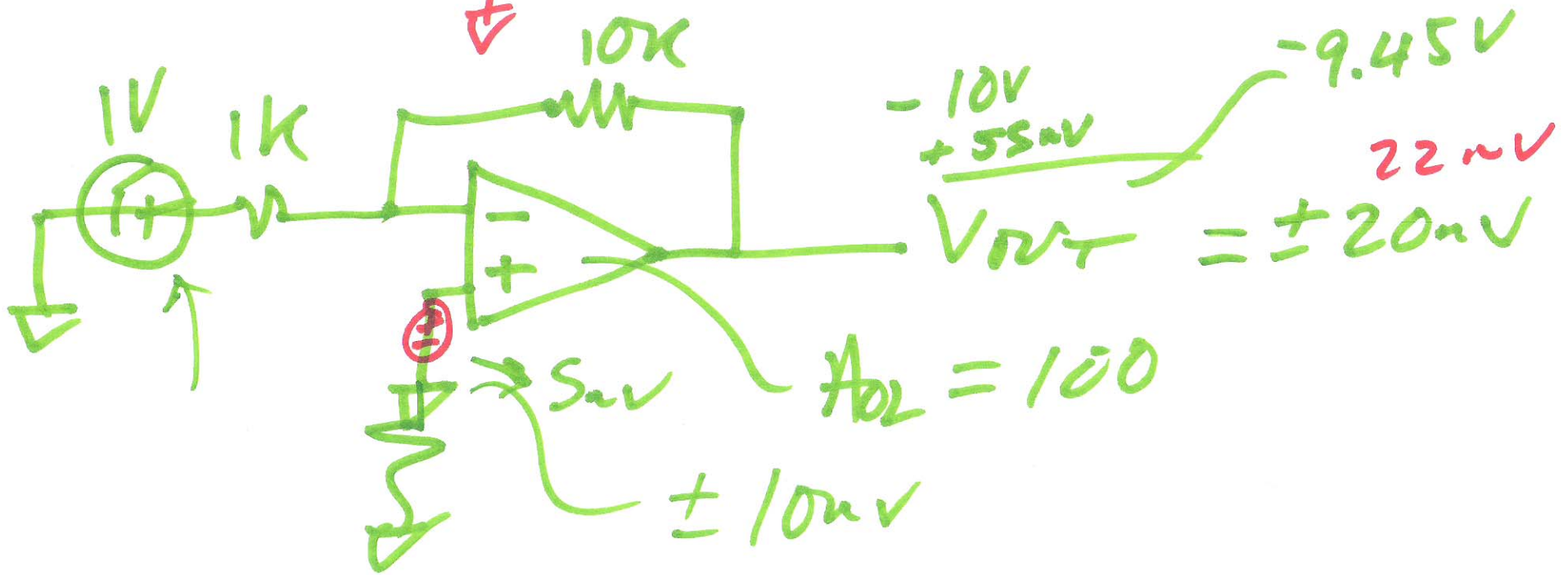
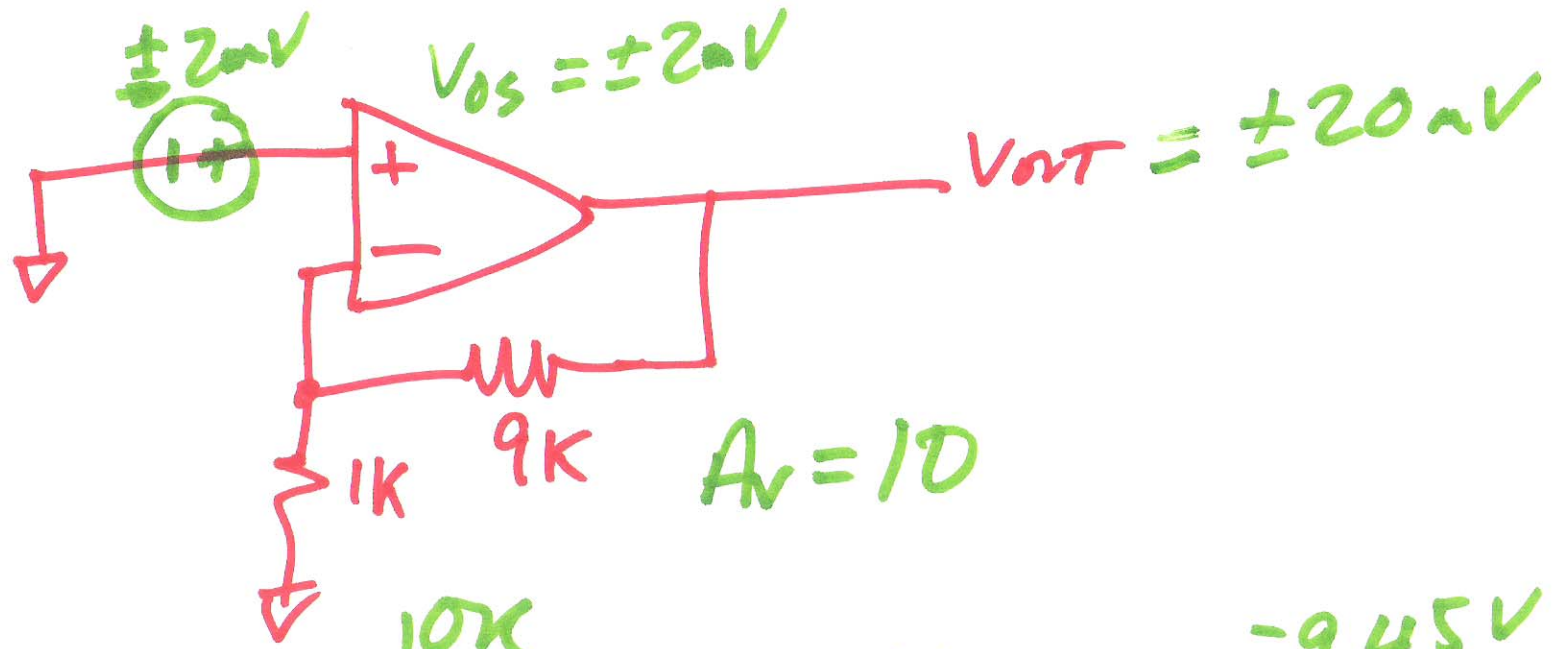
$$V_I \cdot \frac{20k}{120k} = \frac{2V_o}{1000}, \quad V_I = \frac{12V_o}{1000}$$

$$\frac{12V_o}{1000} \cdot \frac{20k \parallel R}{20k \parallel R + 100k} = \frac{V_o}{1000}$$

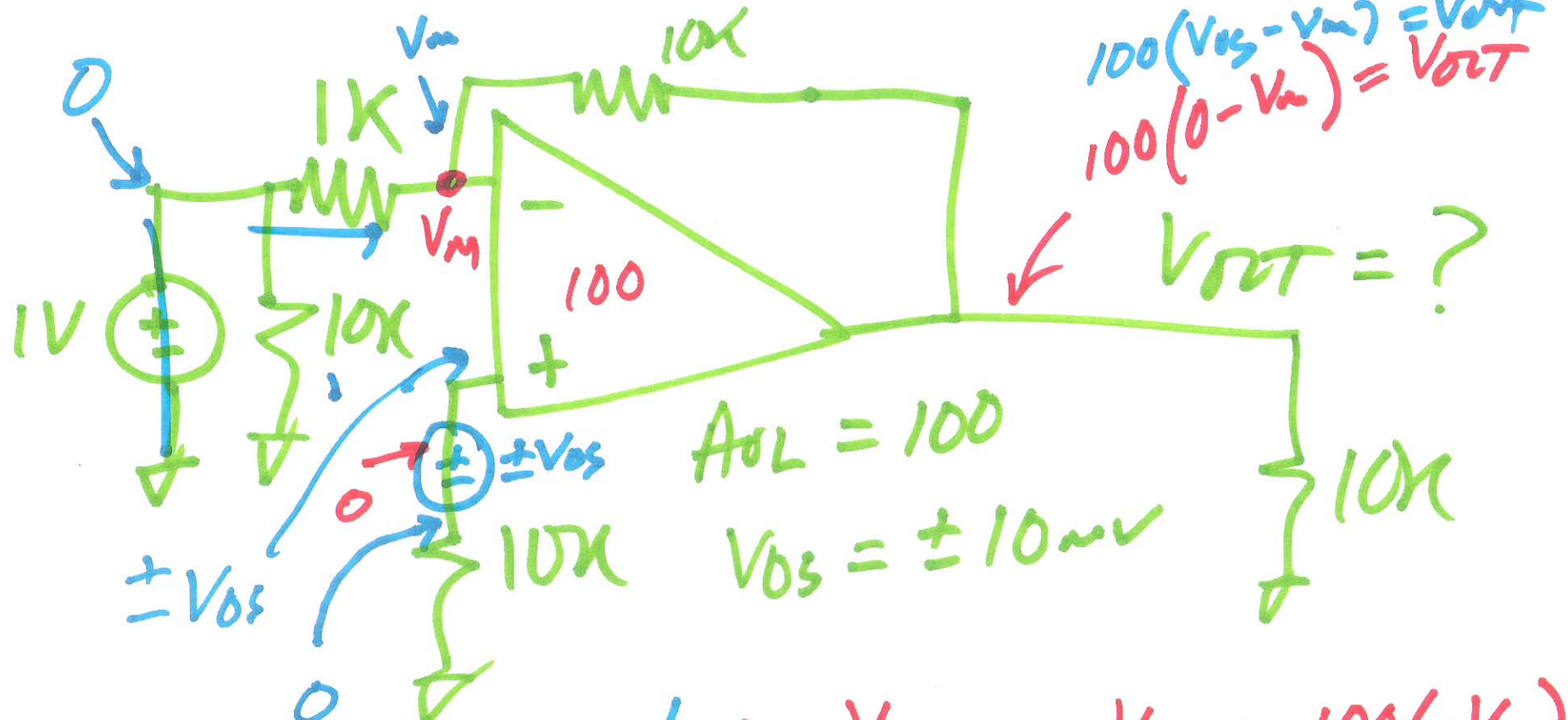
2)



3)



4)

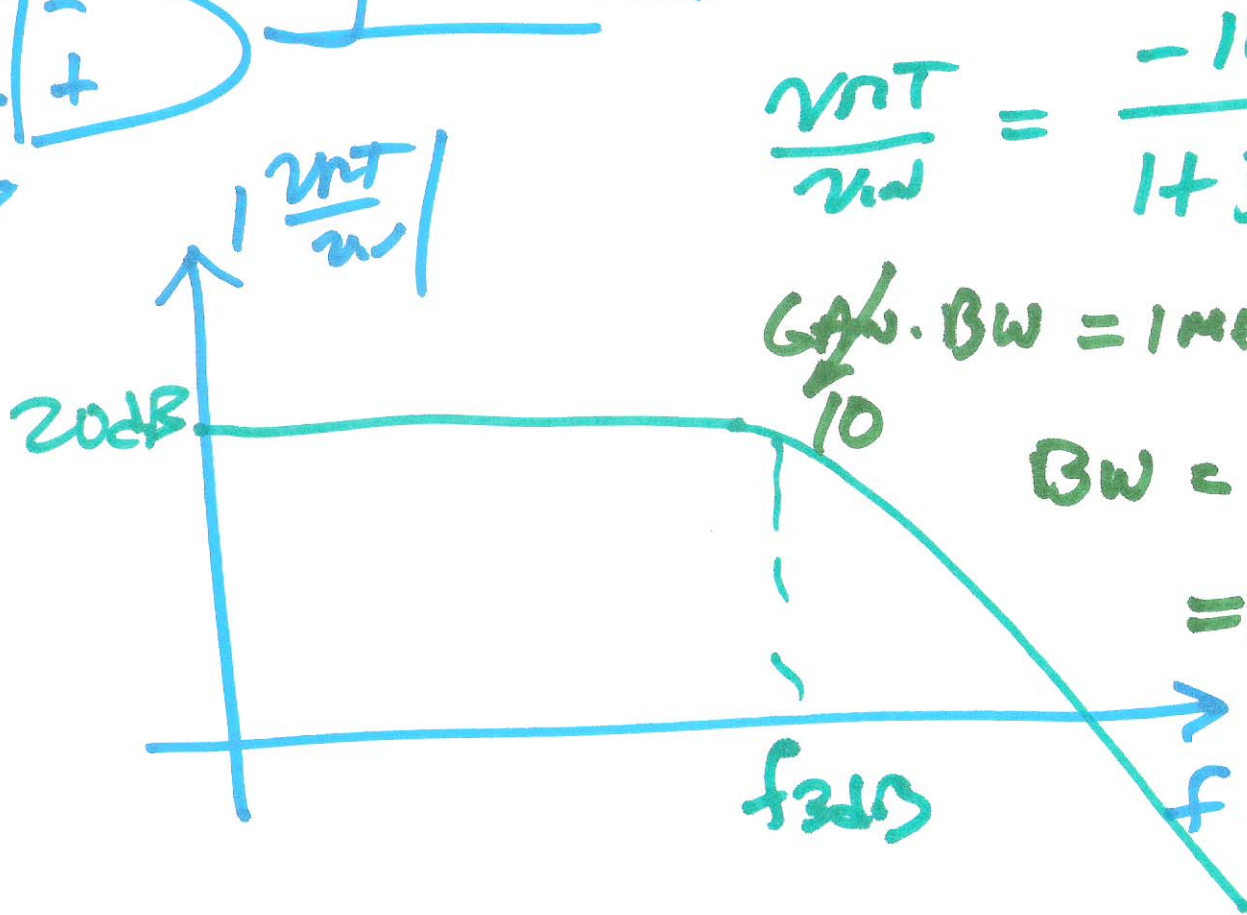
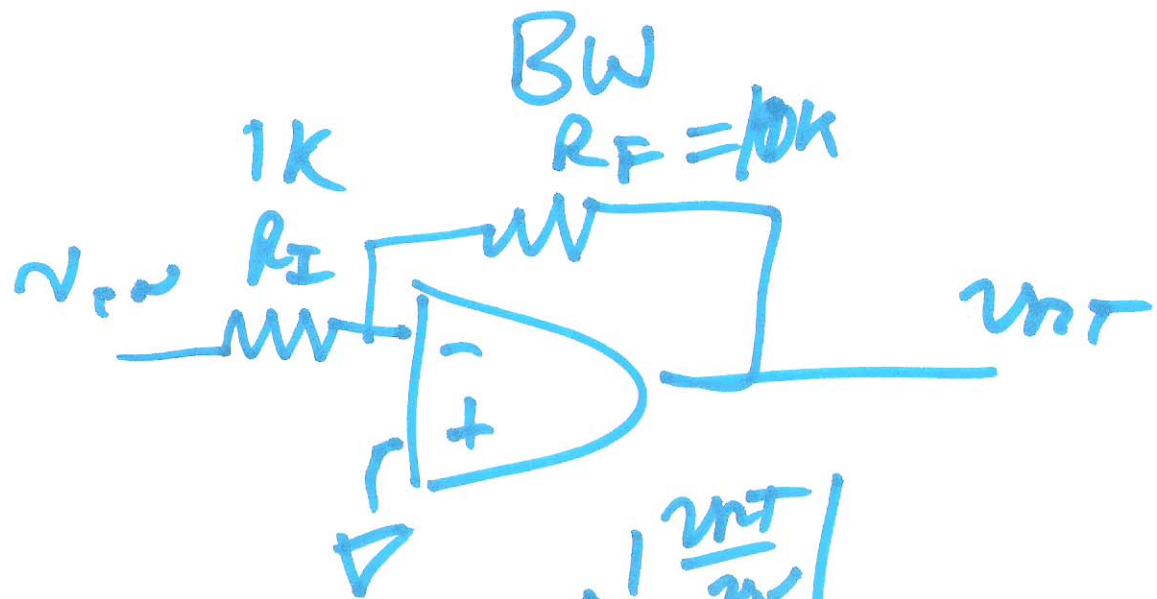


Study for test!

$$\frac{1 - V_m}{1k} = \frac{V_m - 100(-V_m)}{10k}$$

$$\frac{0 - V_m}{1k} = \frac{V_m - 100(V_{os} - V_m)}{10k}$$

5)



$$\frac{v_{out}}{v_{in}} = \frac{-10}{1 + j \frac{f}{f_{3dB}}}$$

$$G_{AV} \cdot BW = 10 \text{ MHz}$$

$$BW = \frac{10 \text{ MHz}}{10} = 1 \text{ MHz}$$

80dB

10000 = 10K

1000 = 60dB

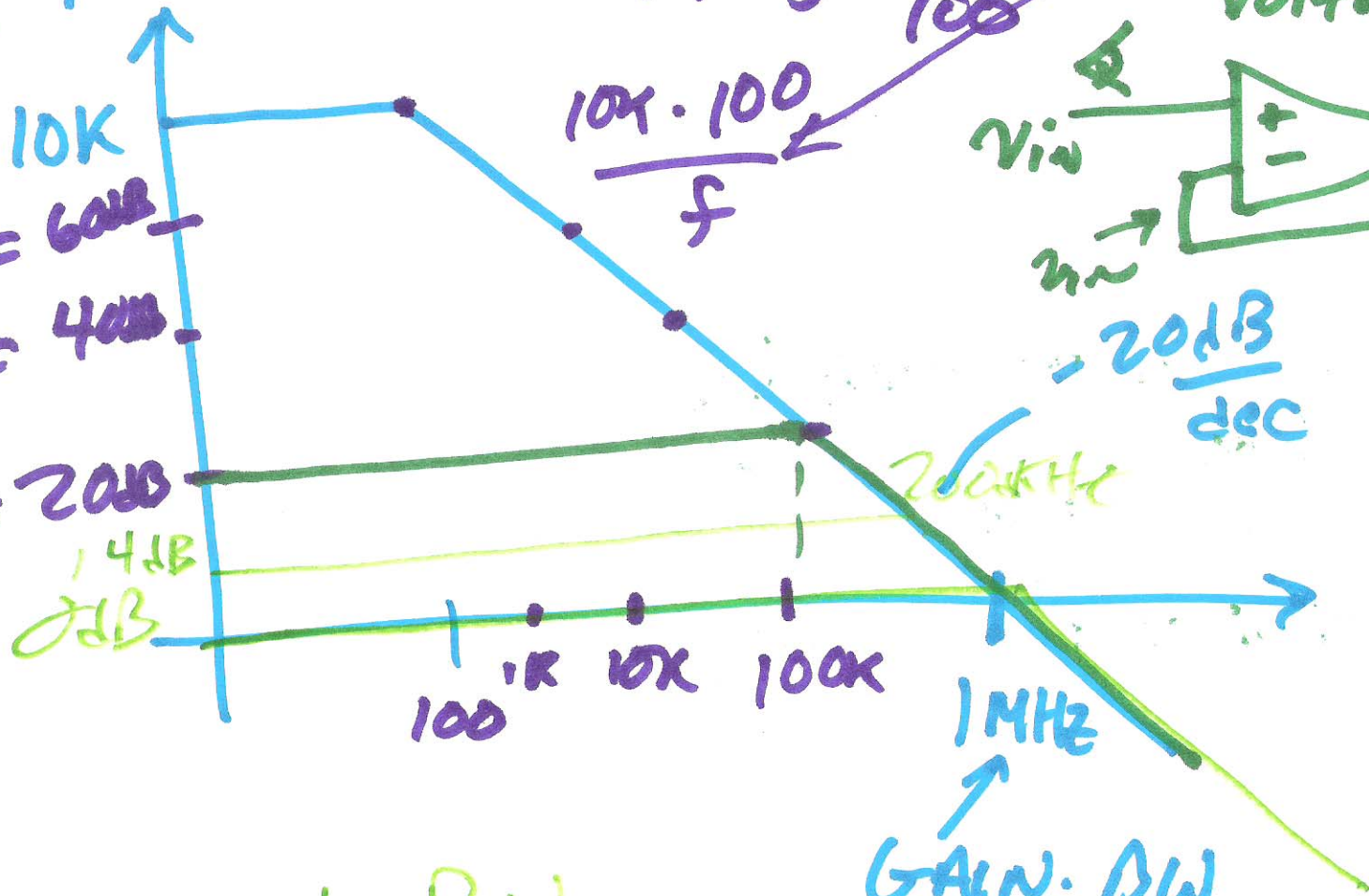
100 = 40dB

10 = 20dB

$$\left| \frac{V_{out}}{V_p - V_n} \right| = \frac{10,000}{1 + j \frac{f}{100}} \approx \left| \frac{10K}{j \frac{f}{100}} \right|$$

$$\frac{10K \cdot 100}{f}$$

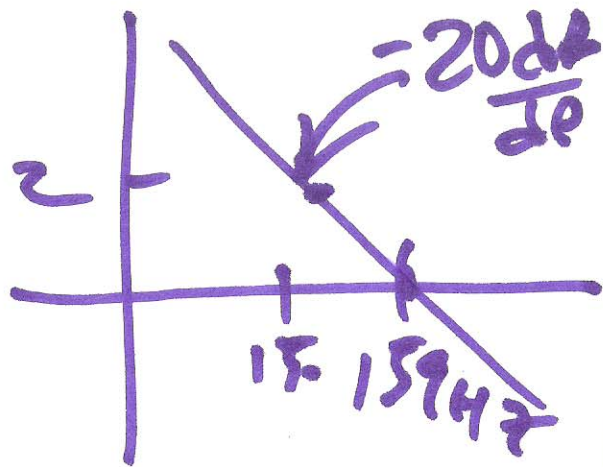
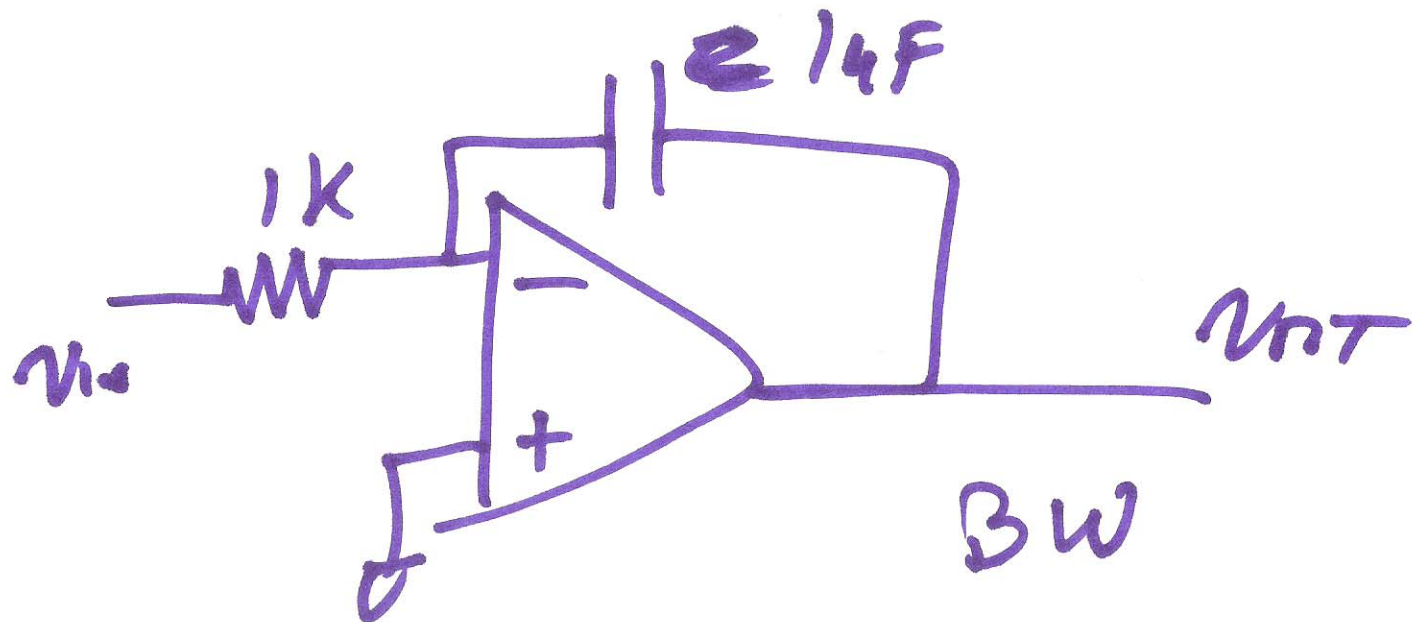
Voltage faller



1MHz = 1 · BW

BW = 1MHz f_T

7)



$$\frac{v_{out}}{v_{in}} = \frac{-\frac{1}{j\omega 10^{-6}}}{1k} = \frac{1}{j2\pi f \cdot 10^{-3}}$$

$$\left| \frac{v_{out}}{v_{in}} \right| = 1 = \frac{1}{2\pi f_T \cdot 10^{-3}}$$

$$f_T = 159 \text{ Hz}$$