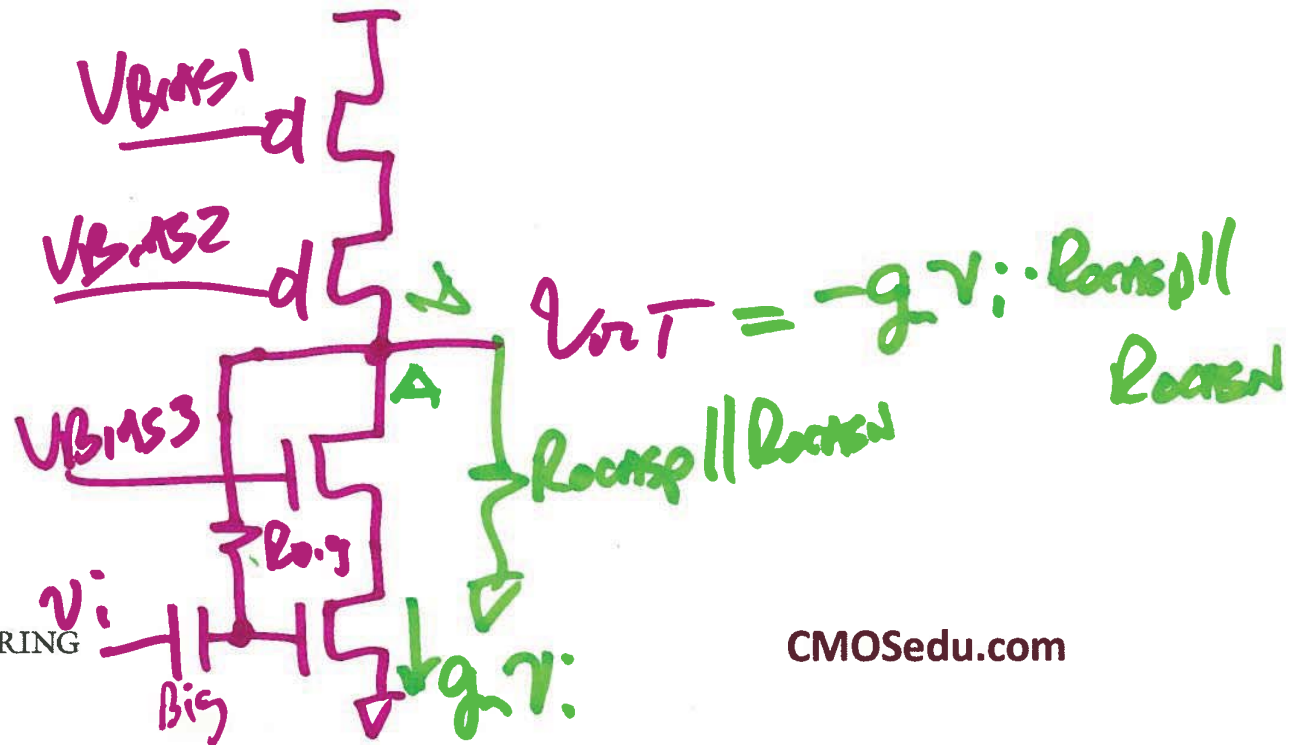


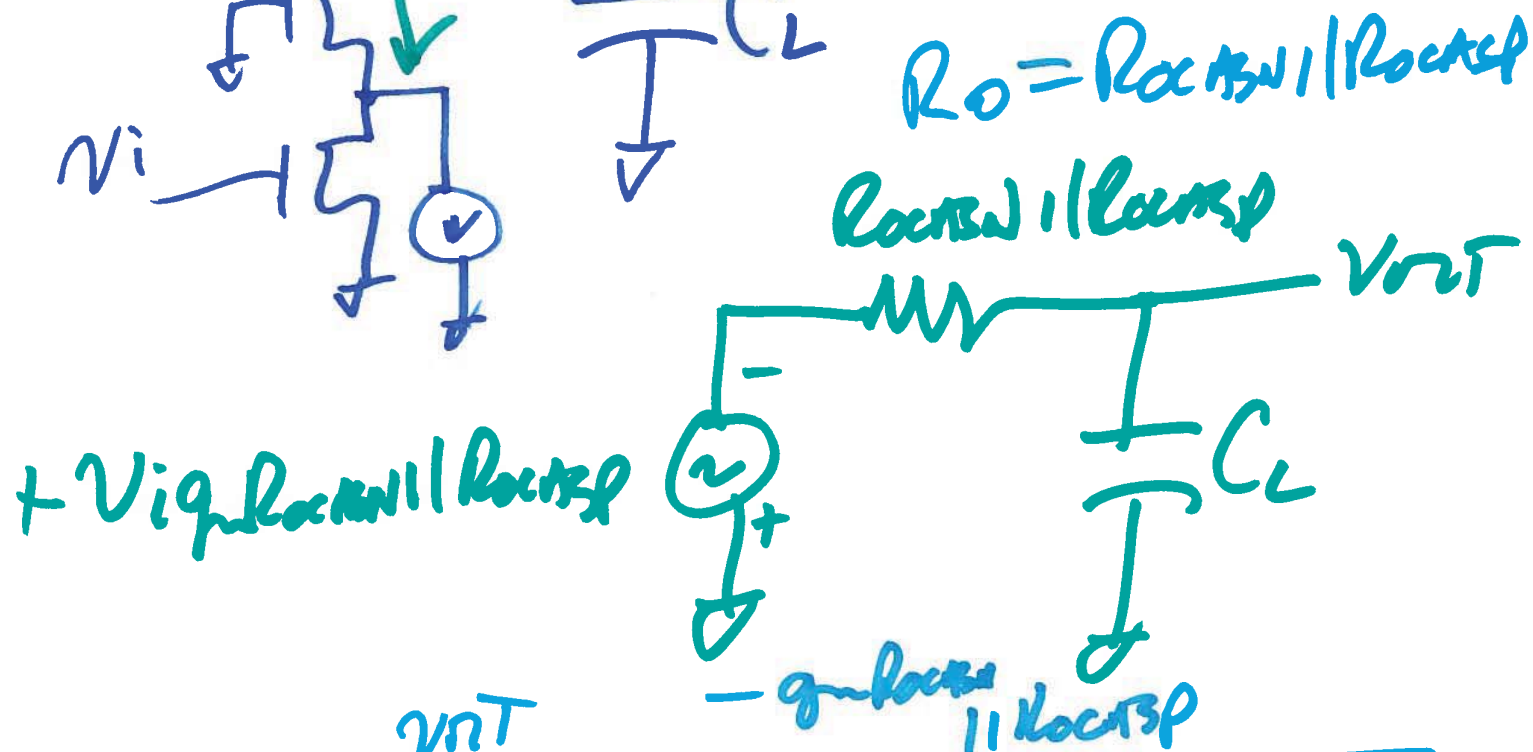
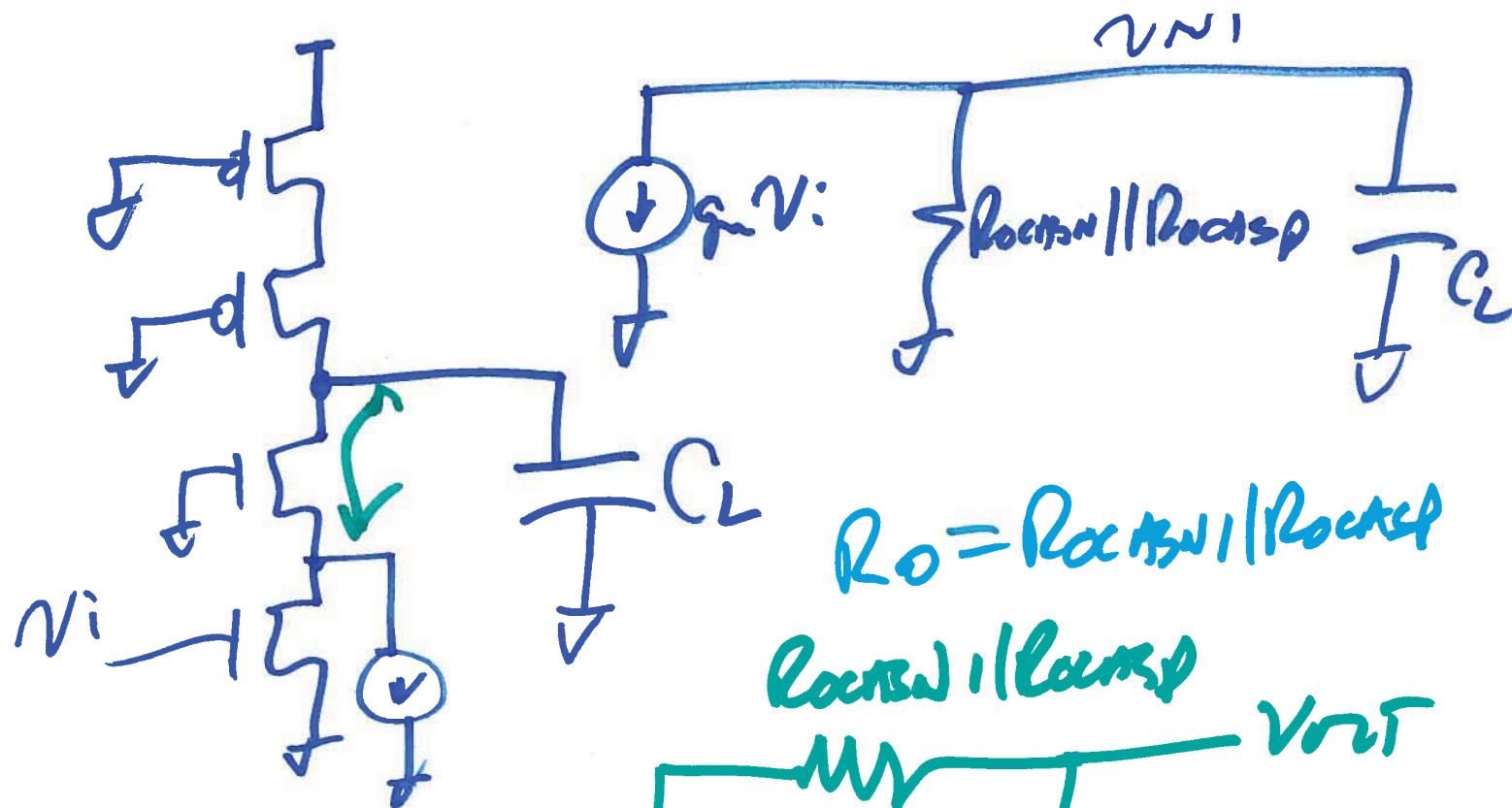
EE 420 / ECE 620

Lecture 19

MARCH 31, 2016

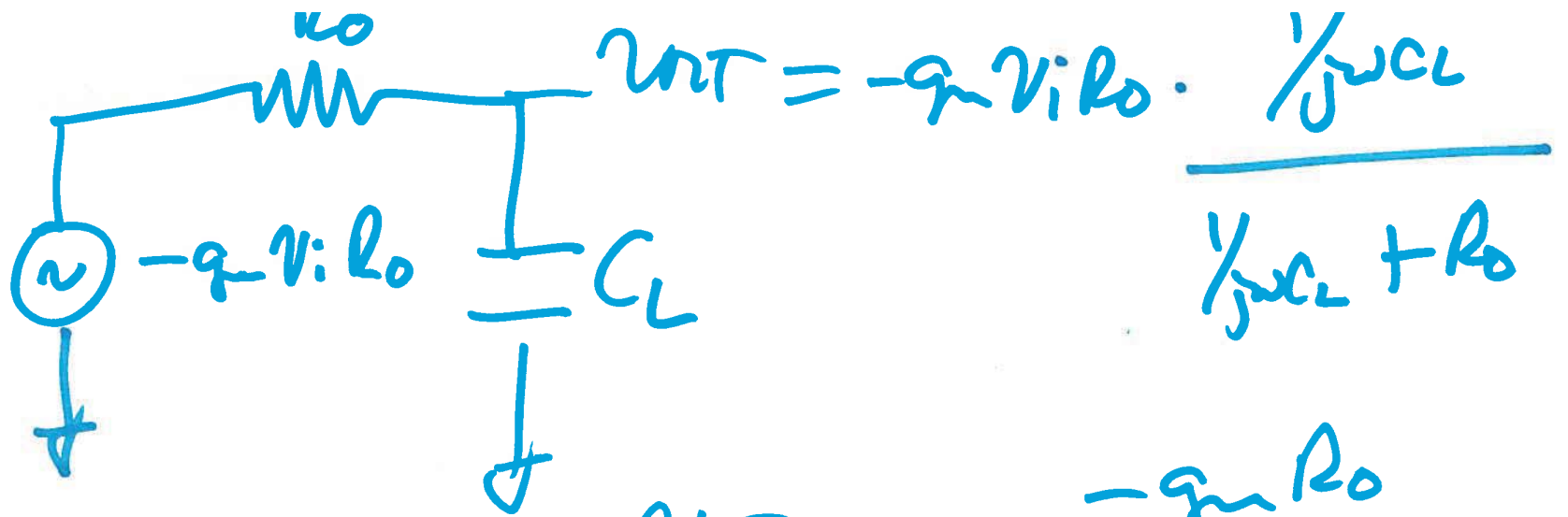
CASCODE Amplifier





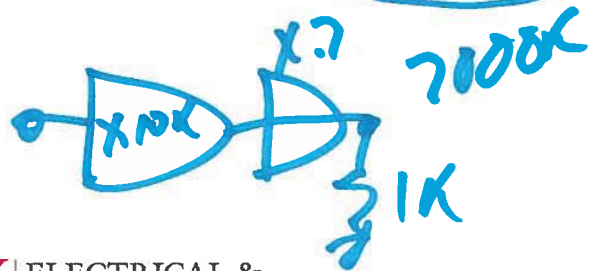
$$\frac{v_{NT}}{v_i} = \frac{-g_{mN} R_{onN} \parallel R_{onP}}{1 + j \cdot 2\pi f \cdot C_L \cdot R_{onN} \parallel R_{onP}}$$

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$$\frac{v_O}{v_i} = \frac{-g_m R_O}{1 + j\omega C_L R_O}$$

$$\frac{v_O}{v_i} = \frac{-g_m R_O}{1 + j f / f_{3dB}}$$



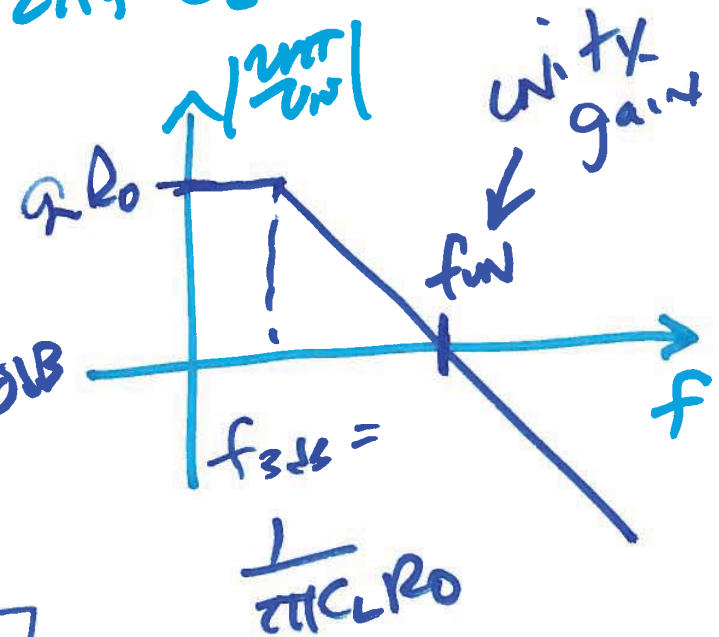
$$1 = 2\pi f_{3dB} C_L R_O = \frac{f}{f_{3dB}}$$

$$f_{3dB} = \frac{1}{2\pi C_L R_O}$$

$$\frac{v_{out}}{v_{in}} = \frac{-g_m R_o}{1 + j2\pi f \cdot C_L \cdot R_o}$$

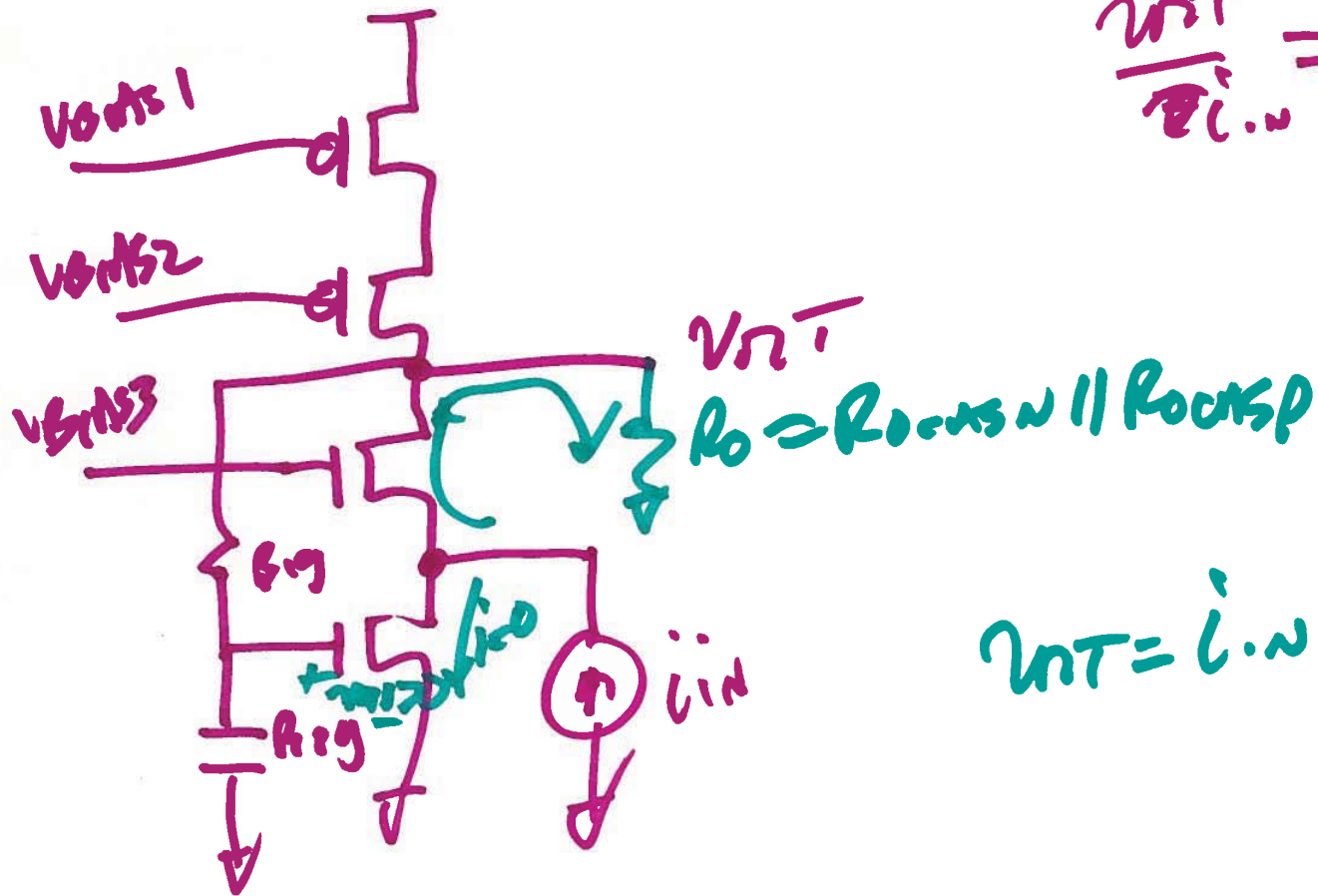
$$\left| \frac{v_{out}}{v_{in}} \right| \approx \frac{g_m R_o}{2\pi f_{in} C_L R_o} = 1 \quad 1 = 0\text{dB}$$

$$f_{in} = \frac{g_m}{2\pi C_L}$$



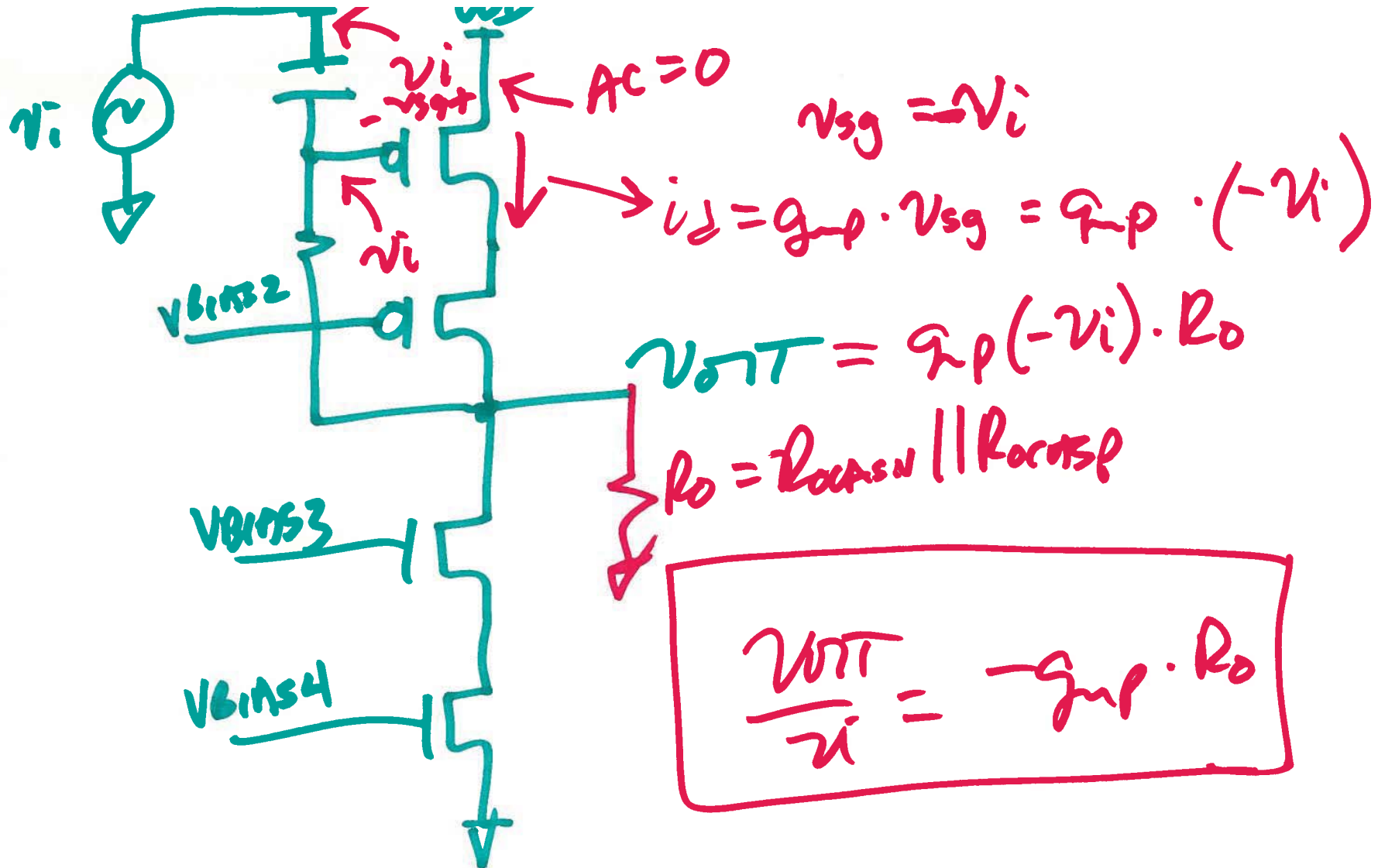
5)

$$\frac{v_{nt}}{i_{in}} = R_o!$$

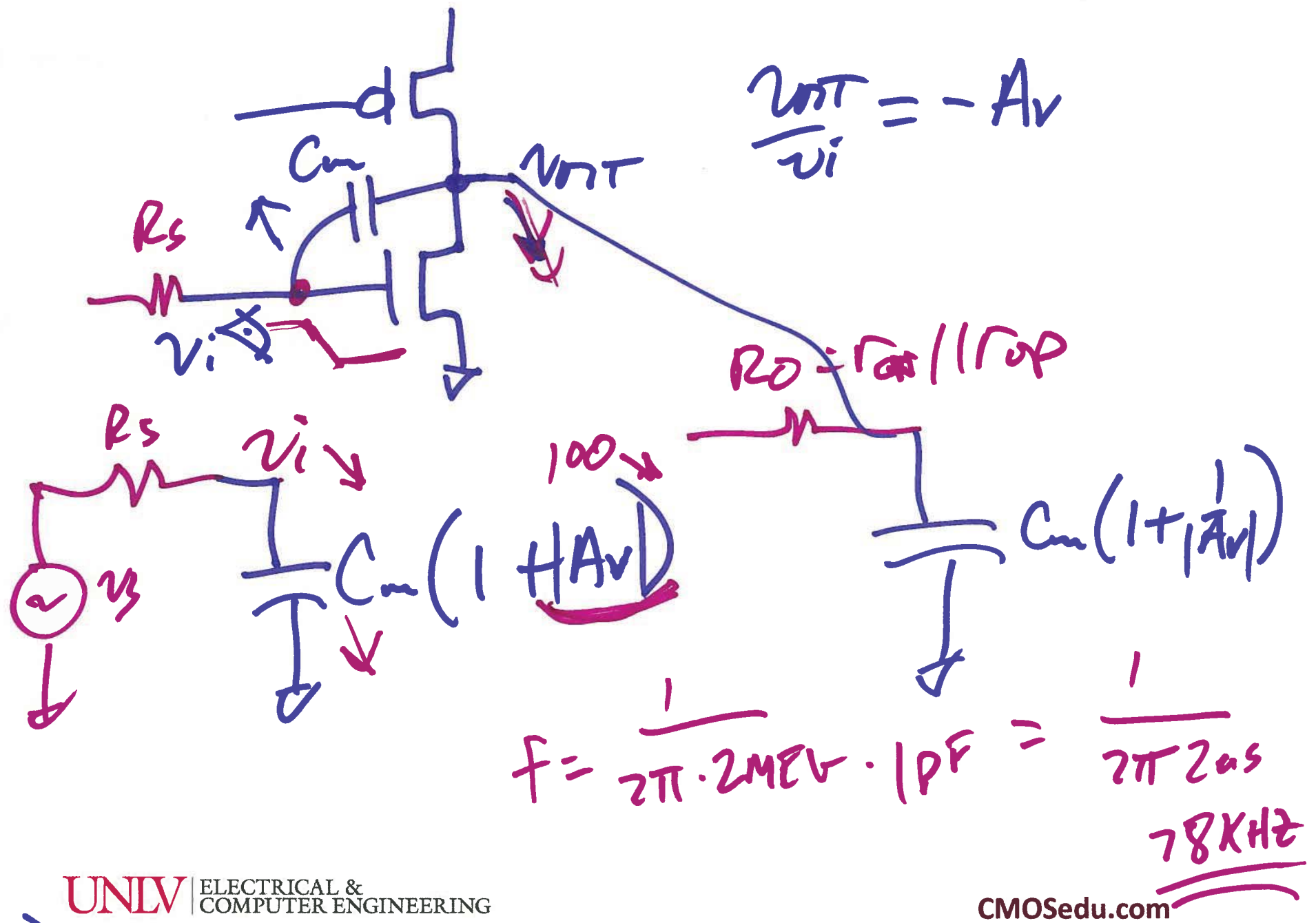


$$R_o = R_{o,nsn} \parallel R_{o,psp}$$

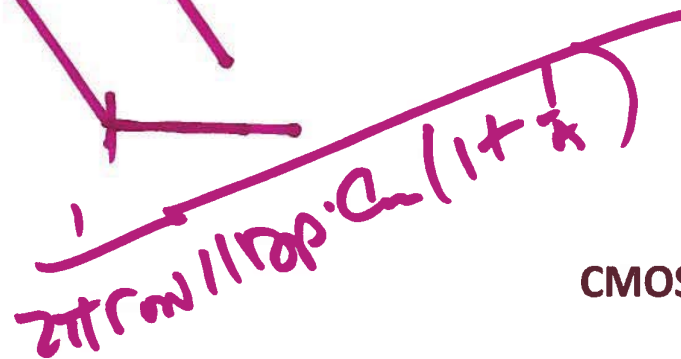
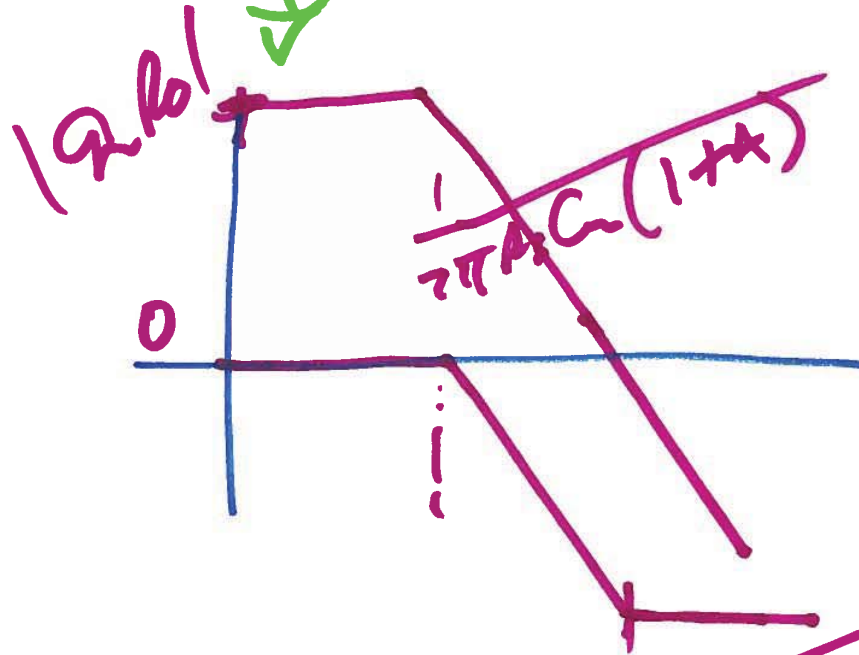
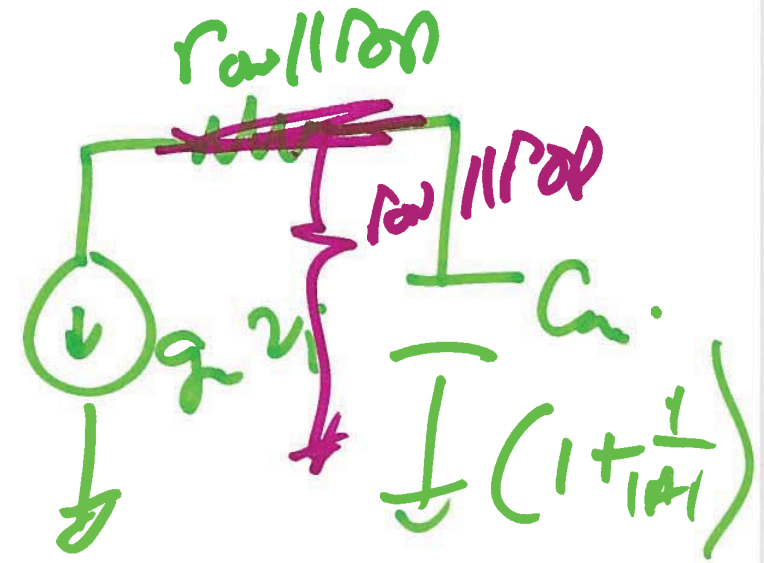
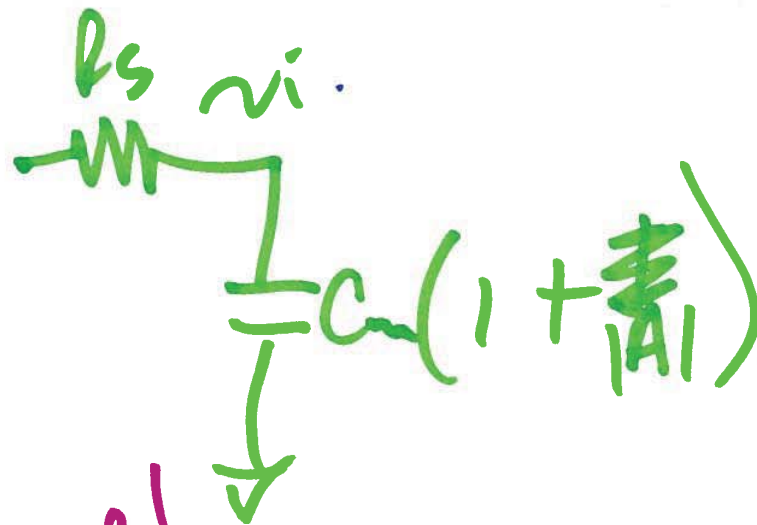
$$v_{nt} = i_{in} \cdot R_o$$



7)



8)



a)

