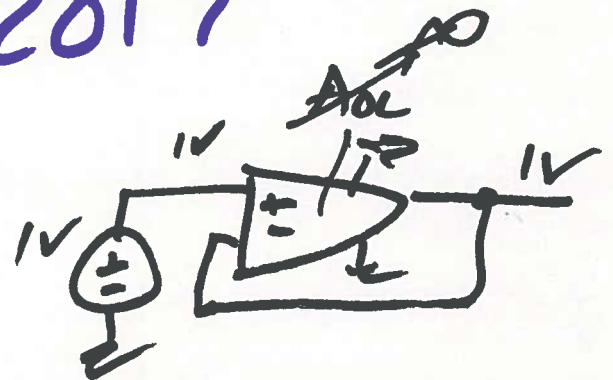
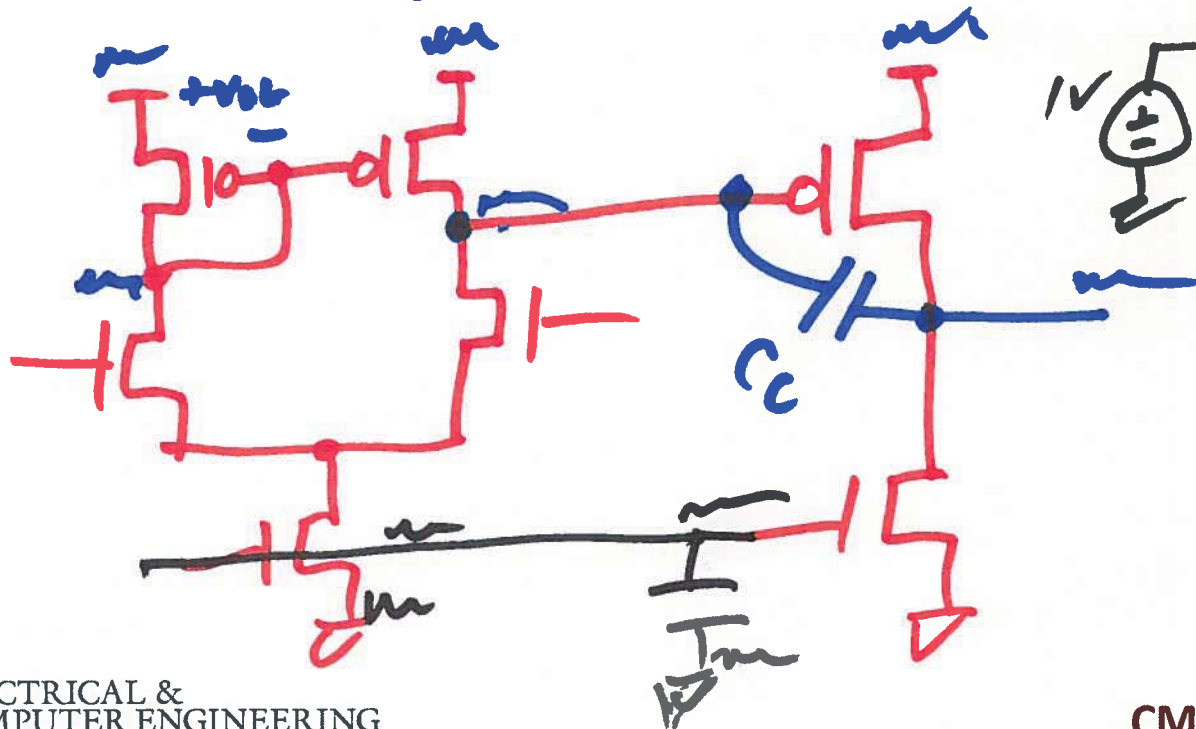
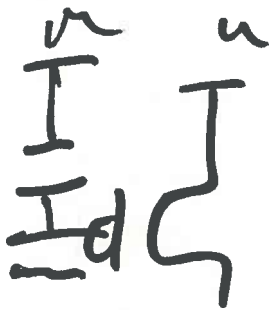


EE 420 / ECG 620

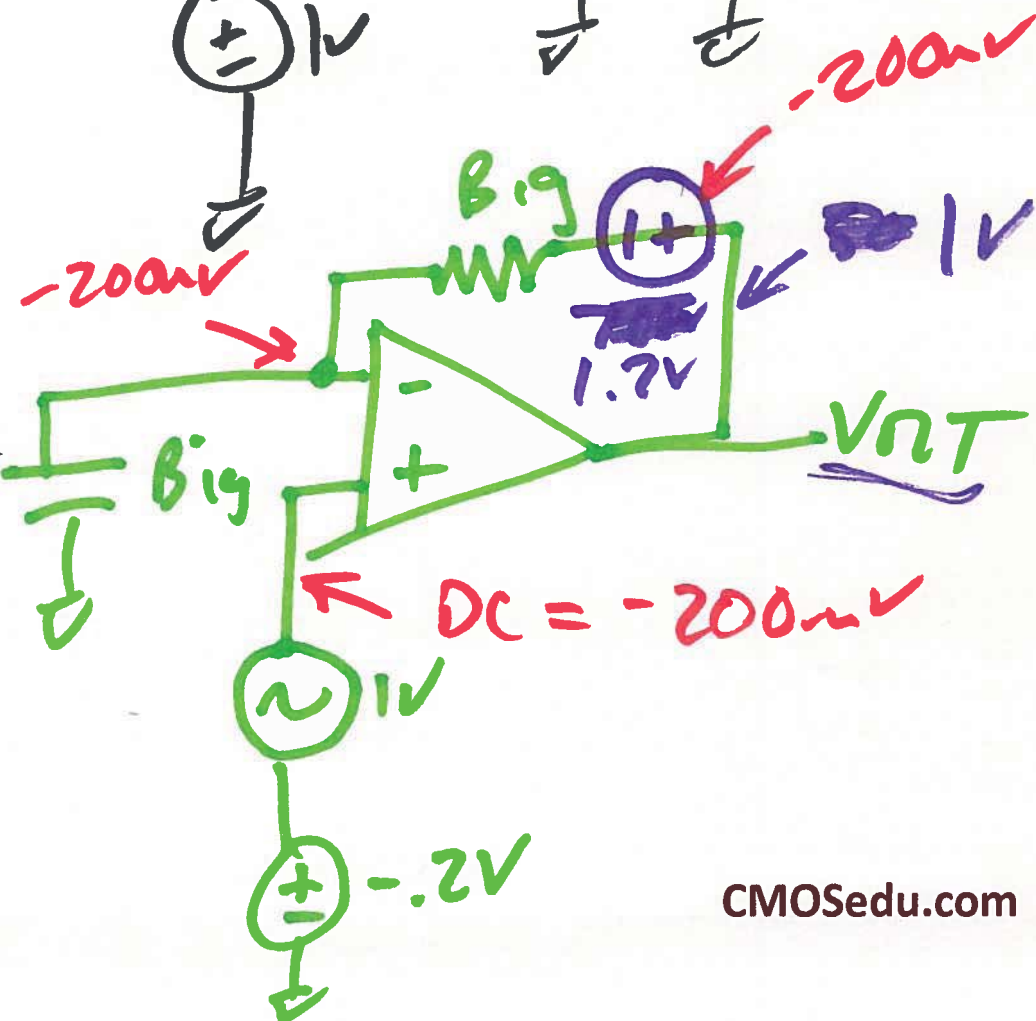
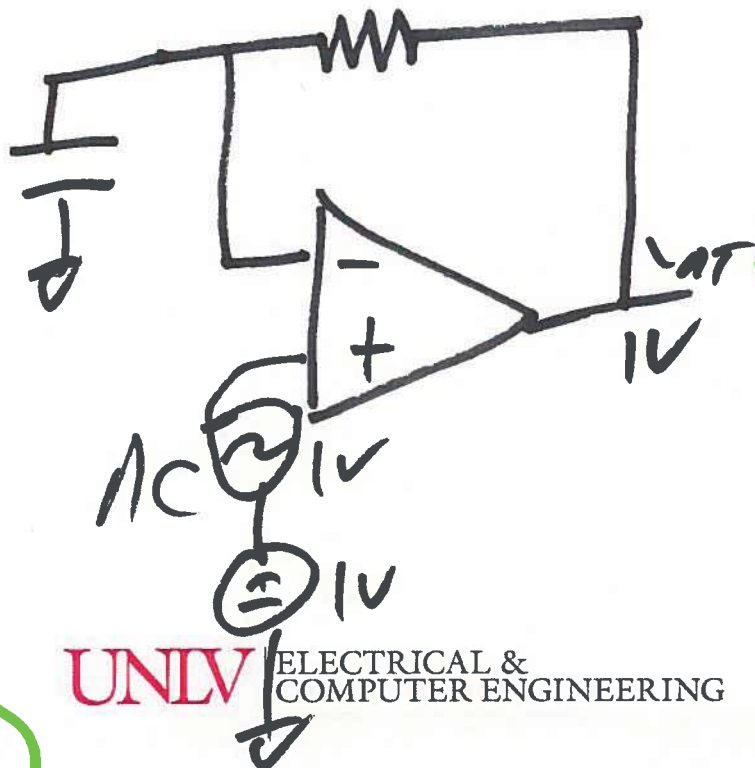
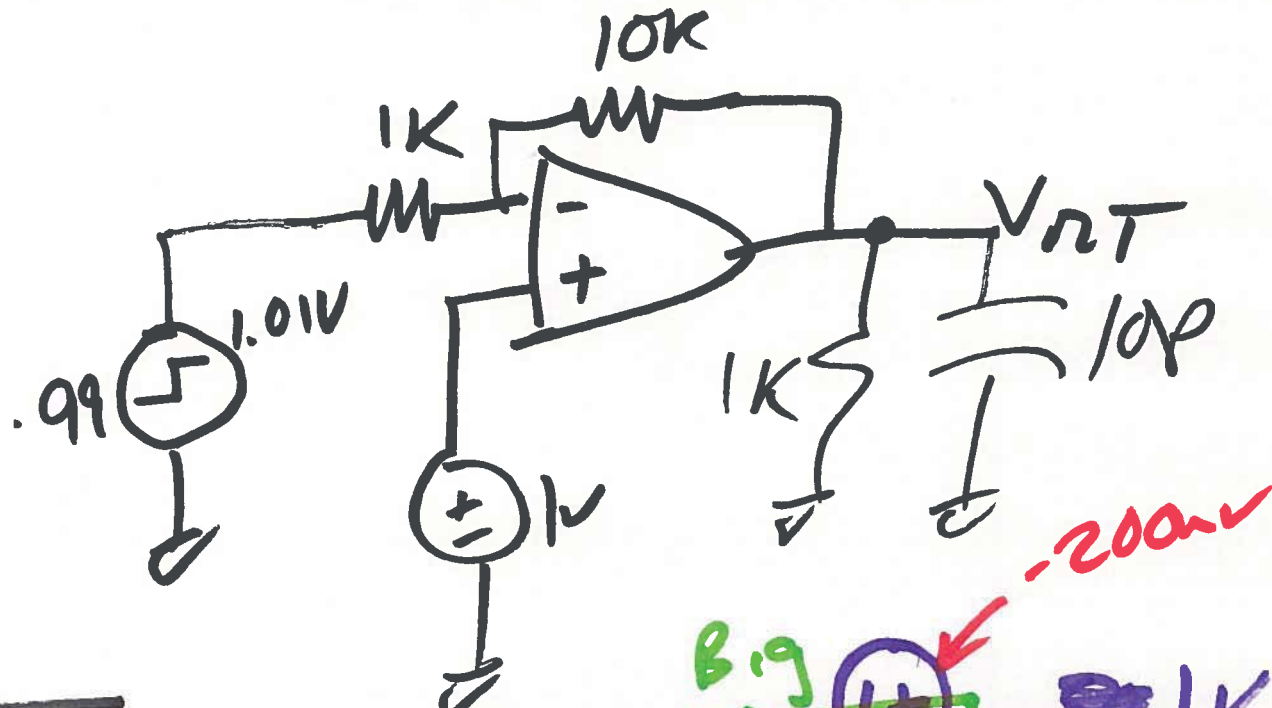
Analog IC Design

Lecture 24

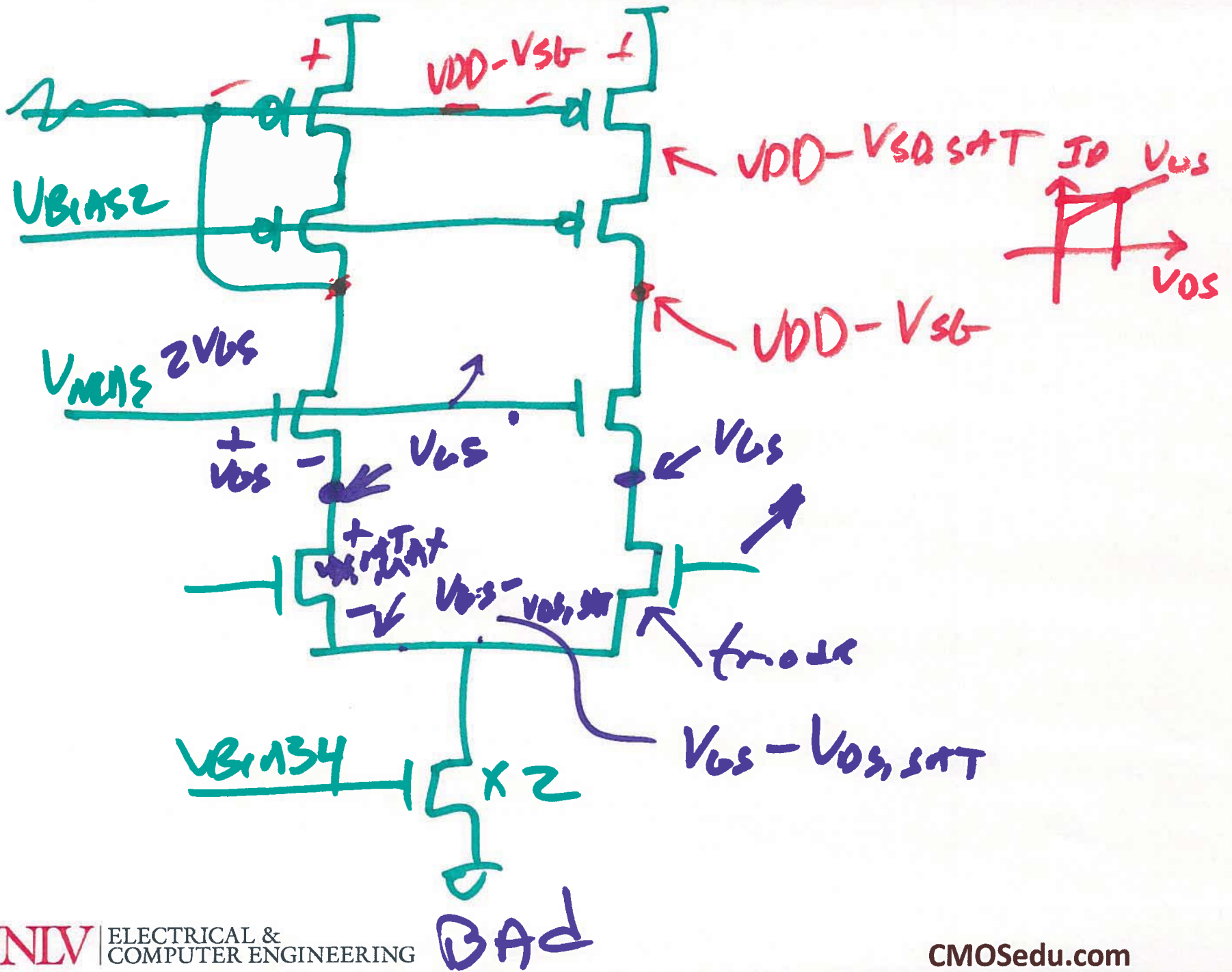
April 24, 2017



1)



2)



3)

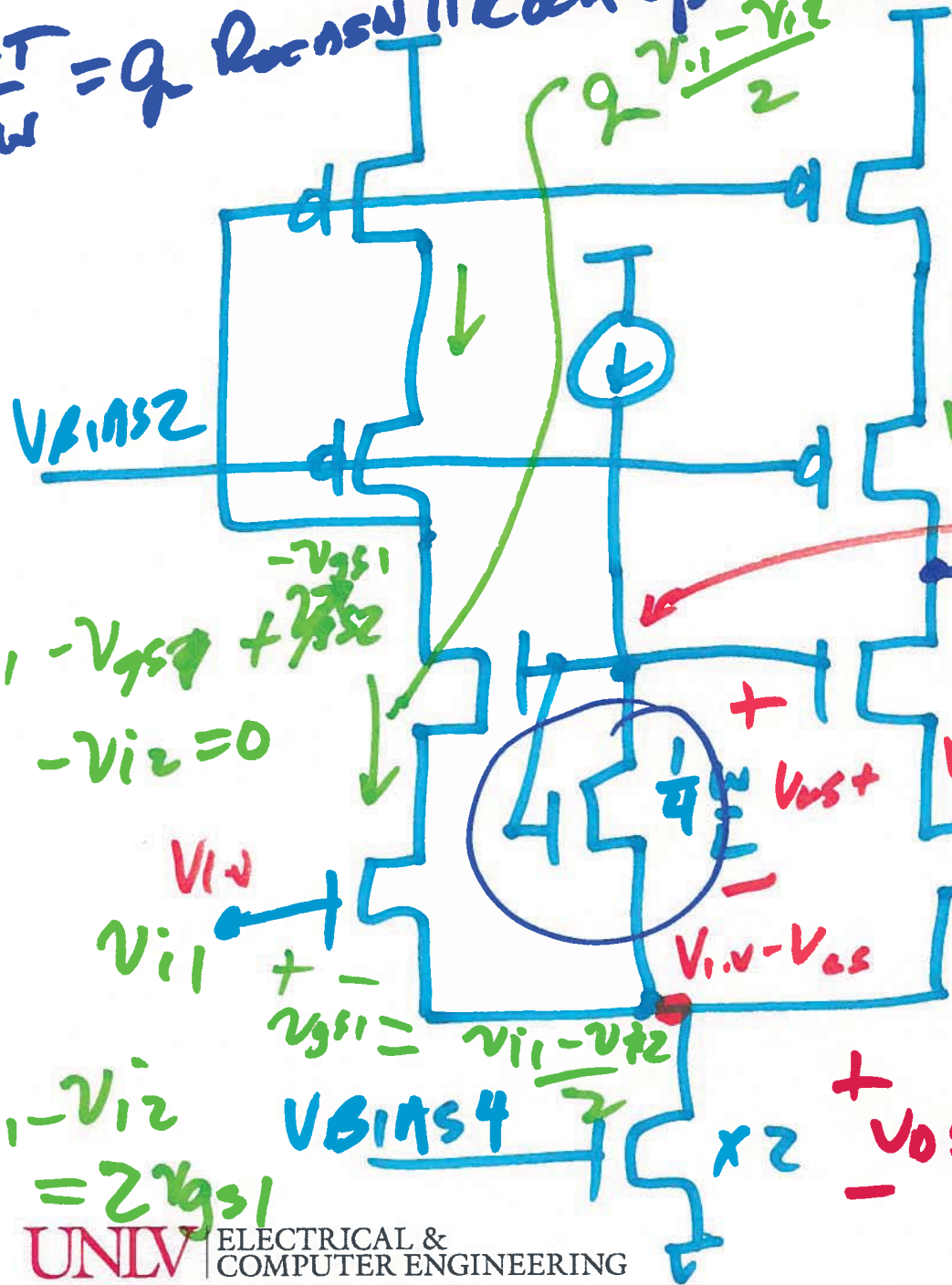




$$\frac{2nT}{w} = g_m R_{out} \approx g_m (R_{out} \parallel R_{out} \approx \rho)$$

$$CMR_{min} = V_{DS} + V_{DS, SAT}$$

Telescopic diff-  
Amp



$$g_m \frac{v_{i1} - v_{i2}}{2}$$

$$V_{in} - V_{DS} + V_{DS} + V_{DS, SAT}$$

$$V_{in} + V_{DS, SAT}$$

$$V_{DS} \geq V_{DS} - V_{THN}$$

$$V_D \geq V_D - V_{THN}$$

$$V_{DD} - V_{SG} \geq$$

$$V_{in} + V_{DS, SAT} - V_{THN}$$

$$5 - 1.15 - .25 + .5$$

$$V_{in} \leq V_{DD} - V_{SG} - V_{DS, SAT} + V_{THN}$$

$$v_{i1} - V_{GS1} + V_{DS2}$$

$$-v_{i2} = 0$$

$$V_{in}$$

$$v_{i1}$$

$$+ -$$

$$V_{GS1} = v_{i1} - v_{i2}$$

$$v_{i1} - v_{i2} = 2V_{GS1}$$

$$V_{BIAS4}$$

5)