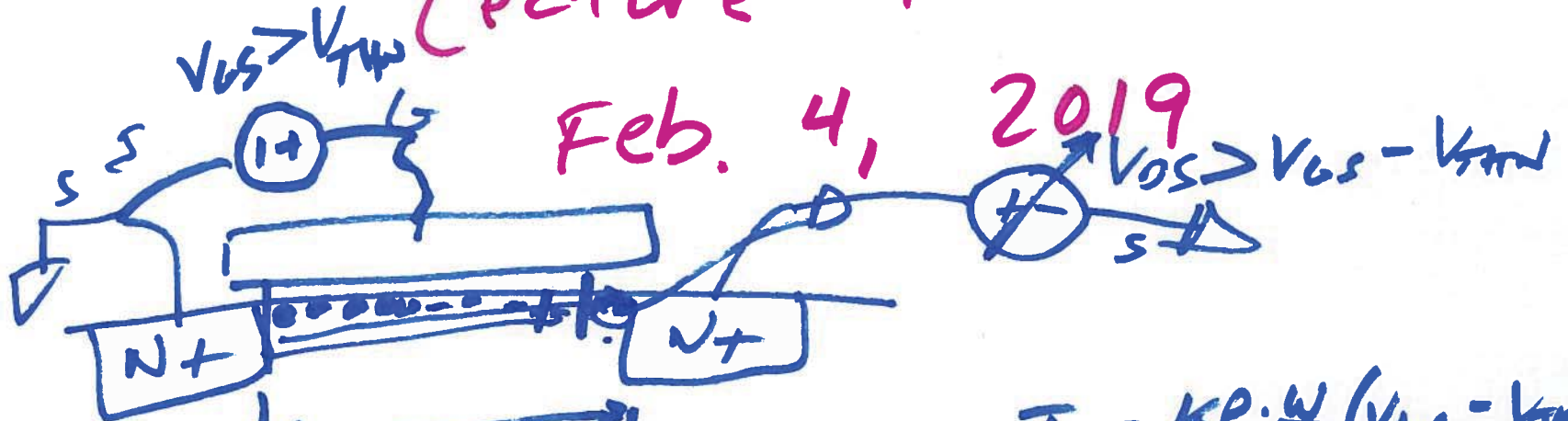


# EE 420 / ECG 620

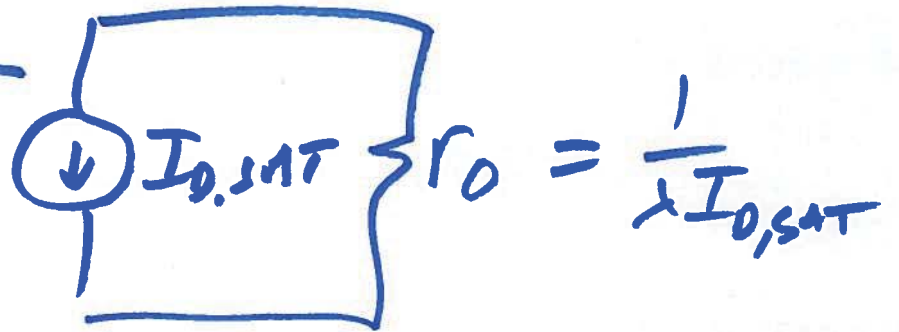
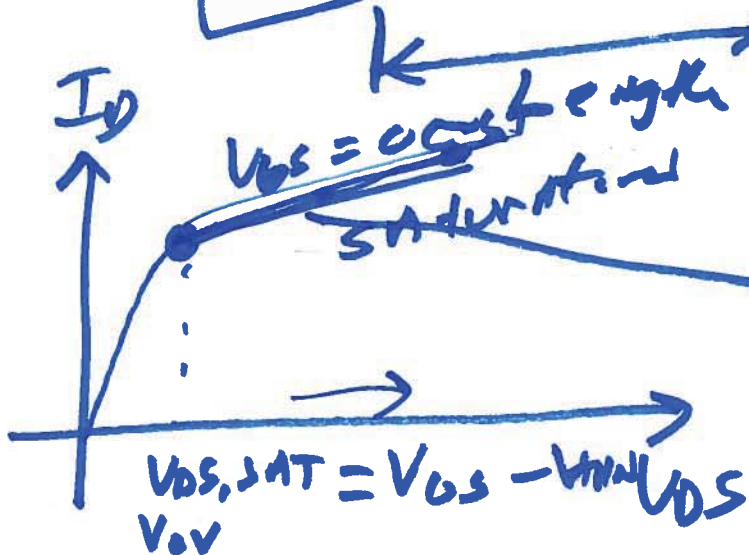
## Analog IC Design

### Lecture 4

Feb. 4, 2019

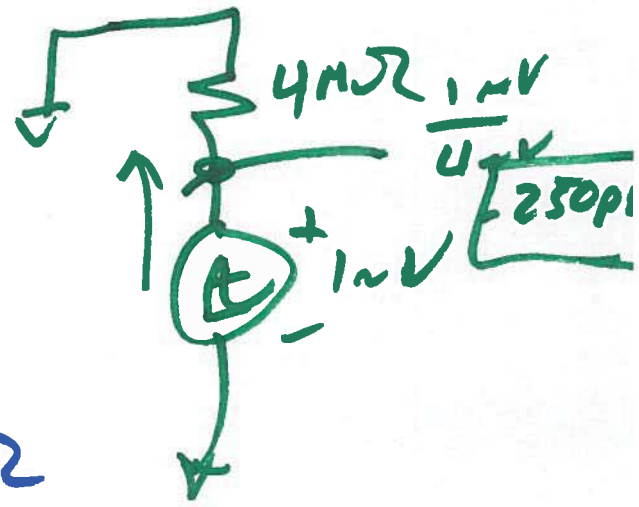
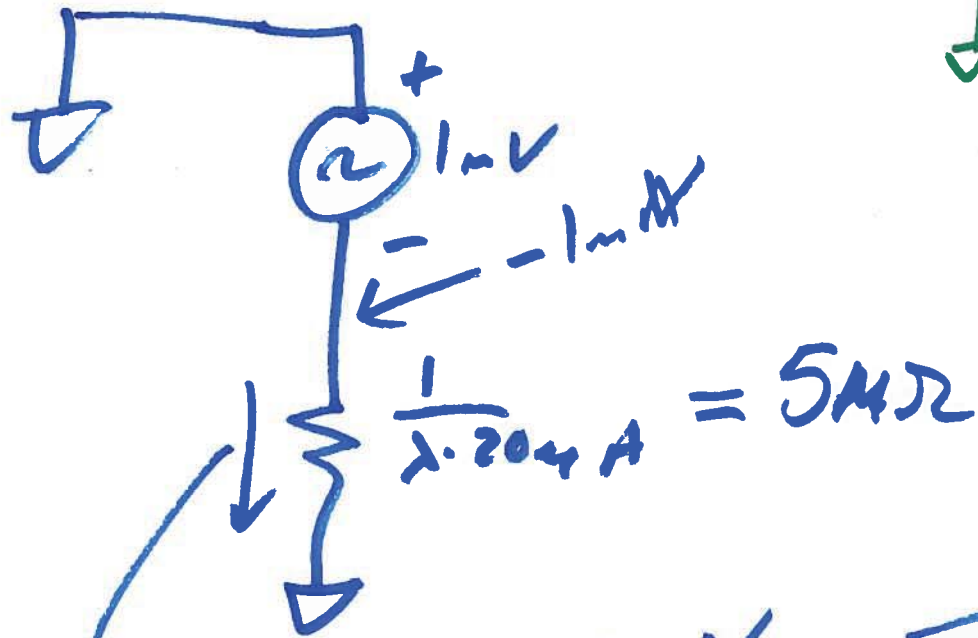


$$I_D = \frac{K_P \cdot W}{2} \frac{L}{L} (V_{GS} - V_{TH})^2$$



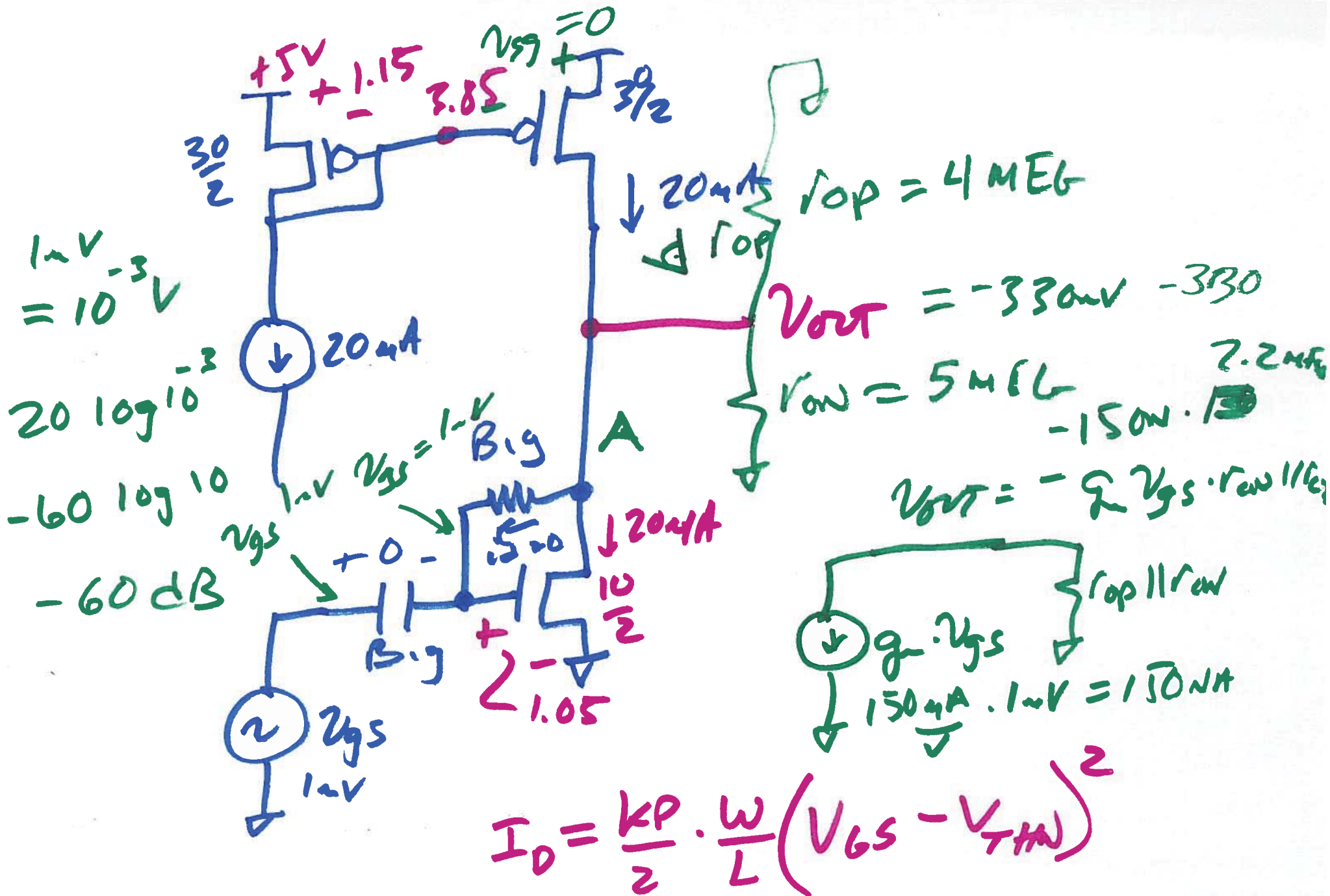
11

AC CKT  
VDD (AC Ground)



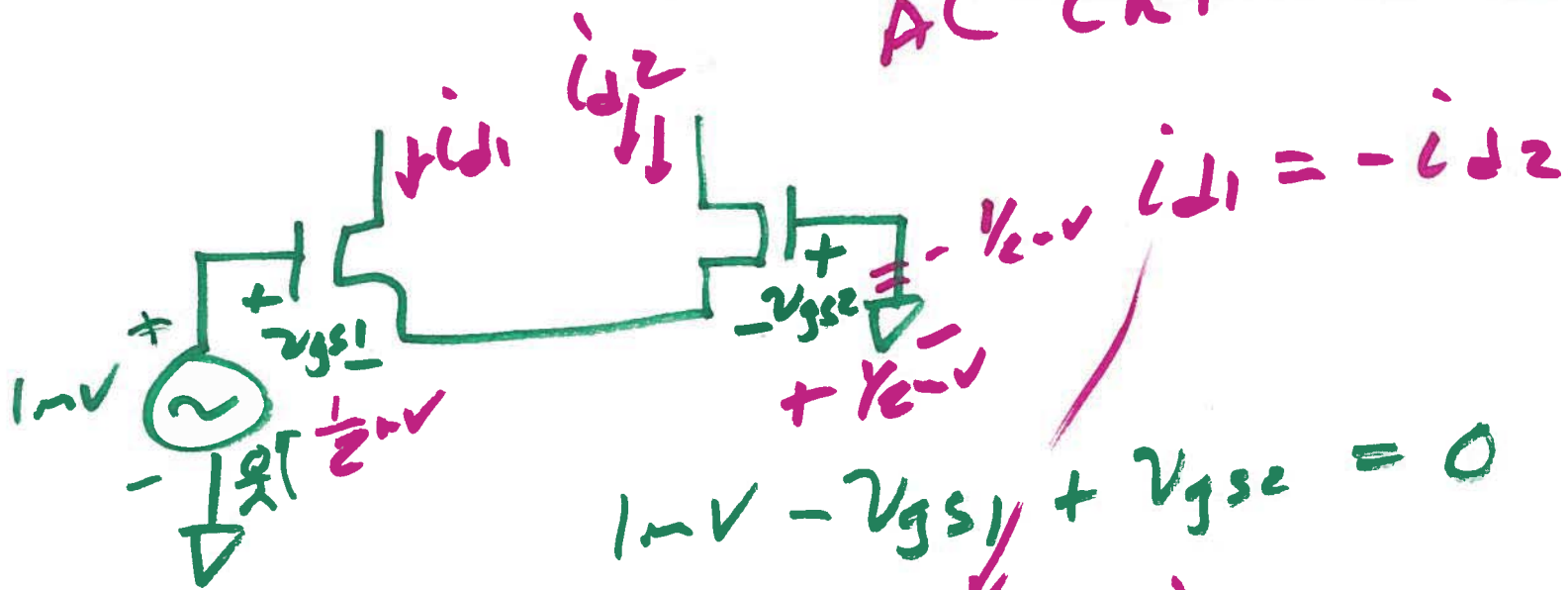
$$i_d = \frac{-1mV}{5M\Omega} = \boxed{-200pA} = -0.2nA$$

2)



3)

# AC CKT



$$1\text{mV} - v_{gs1} + v_{gs2} = 0$$

$$1\text{mV} - \frac{i_{d1}}{g_m} + \frac{i_{d2}}{g_m} = 0$$

$$1\text{mV} + \frac{i_{d2}}{g_m} + \frac{i_{d2}}{g_m} = 0$$

$$i_{d2} = \frac{-1\text{mV}}{2} \cdot g_m$$

$$v_{gs2} = \frac{1}{2} \text{mV}$$

