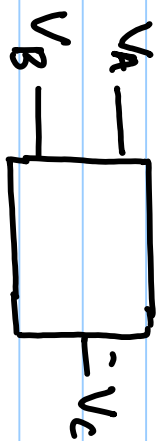


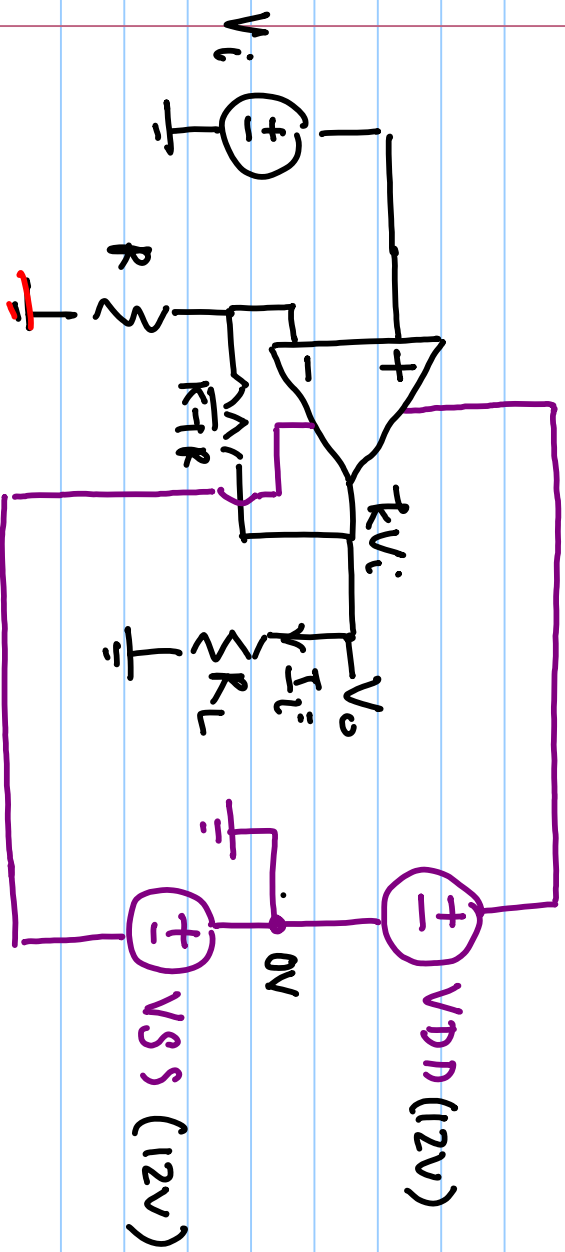
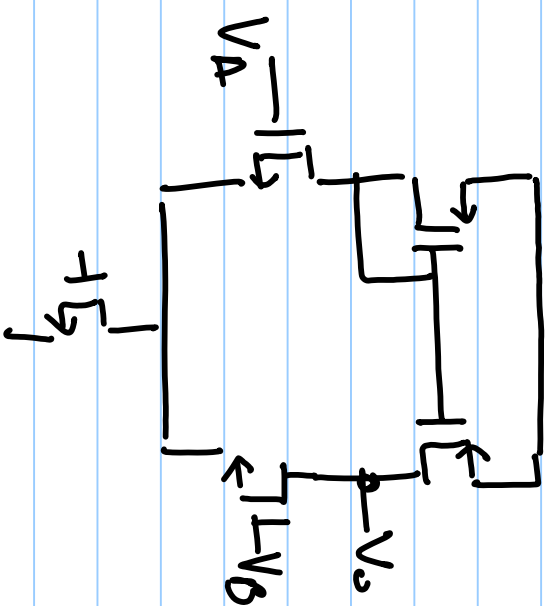
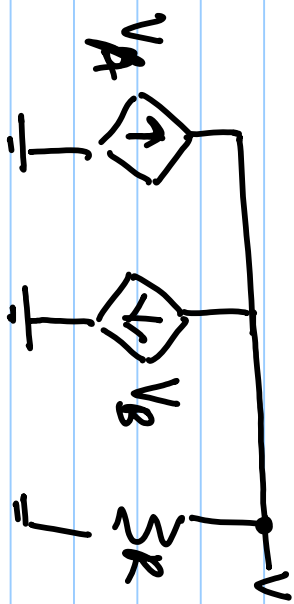
Lecture # 10



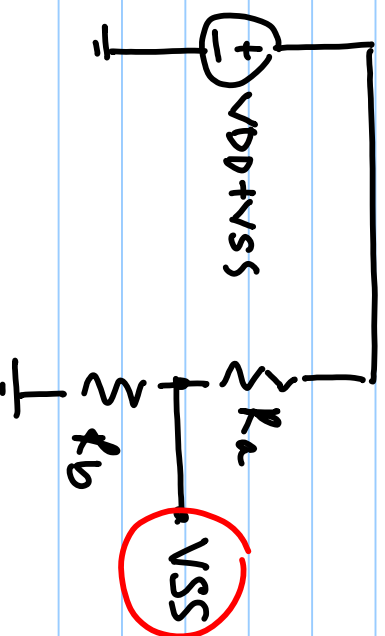
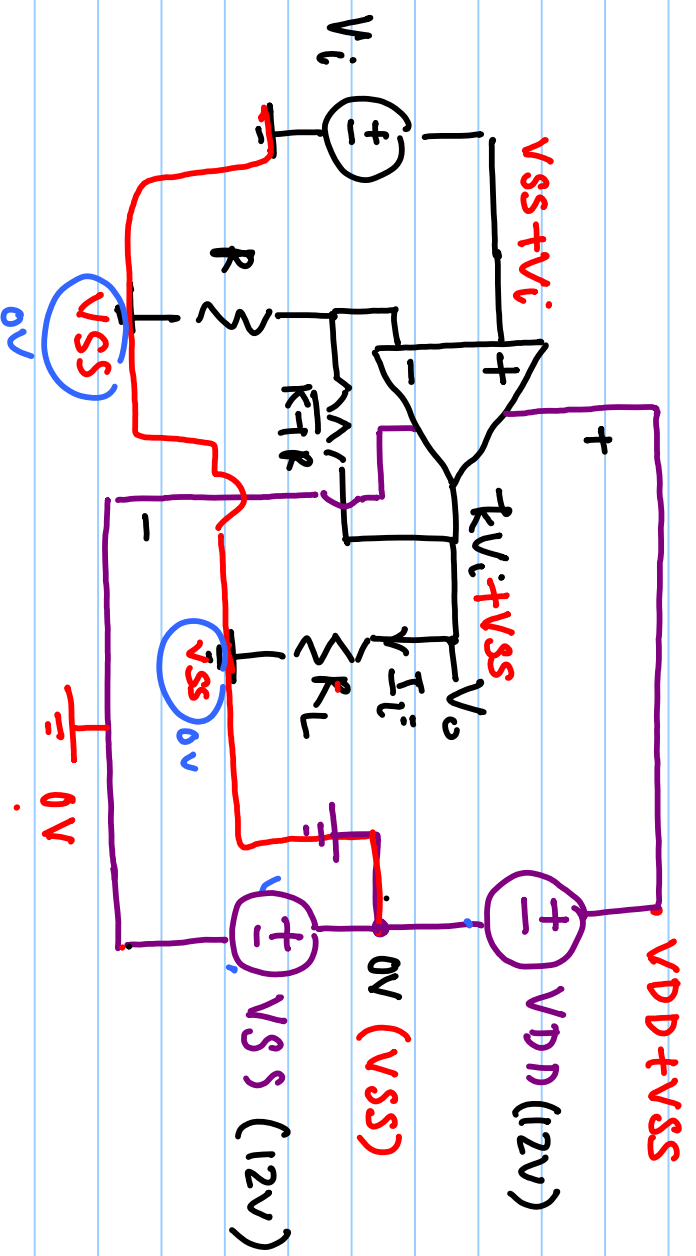
$$V_C \propto (V_A - V_B)$$

$$I_A \propto V_A$$

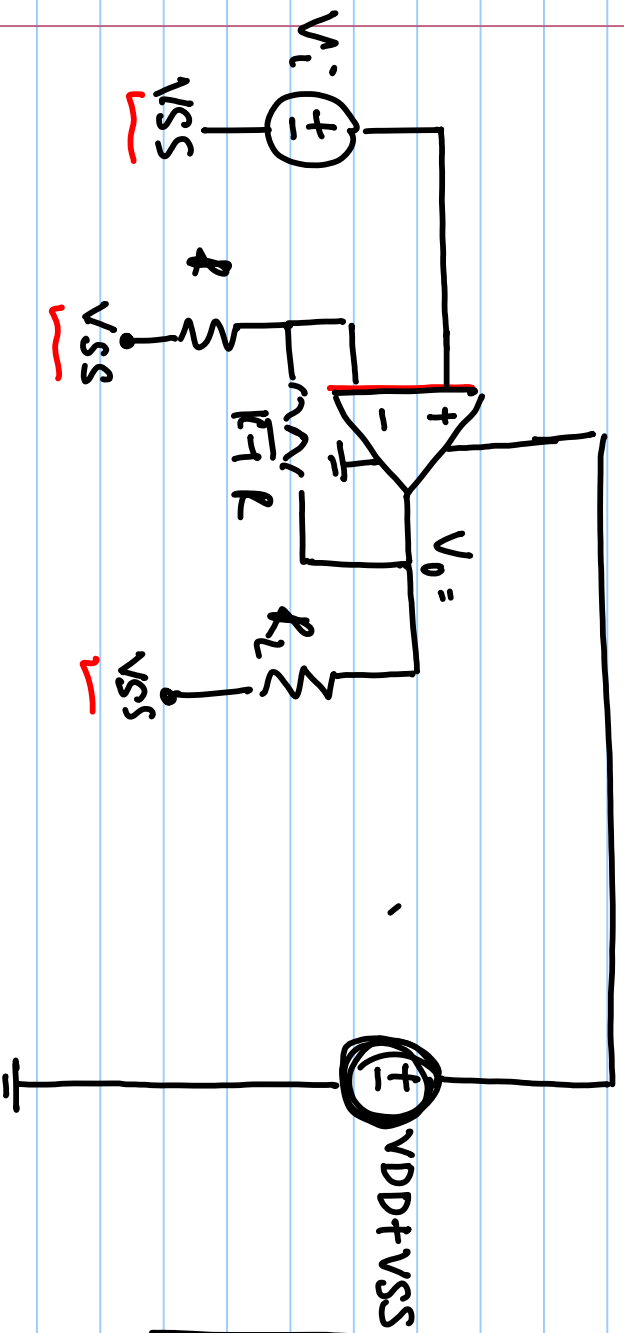
$$I_B \propto -V_B$$



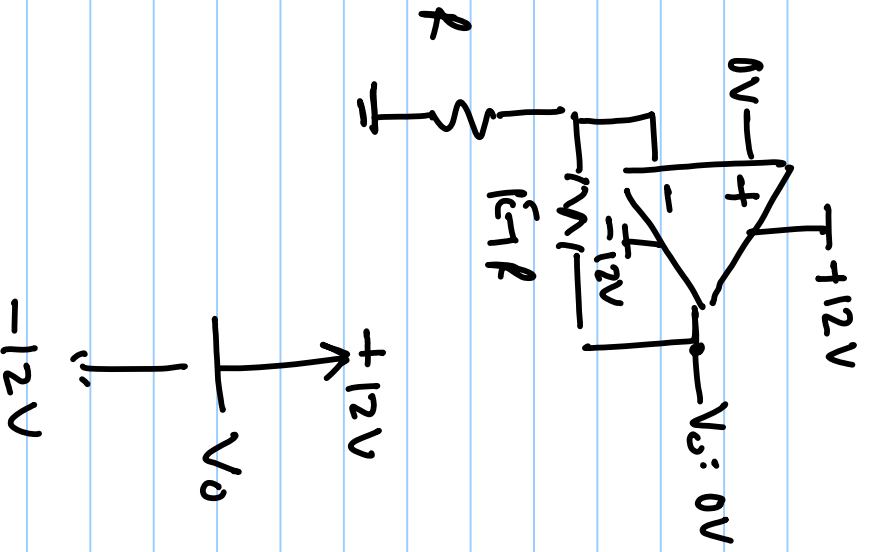
$$\frac{V_o}{V_i} = R$$



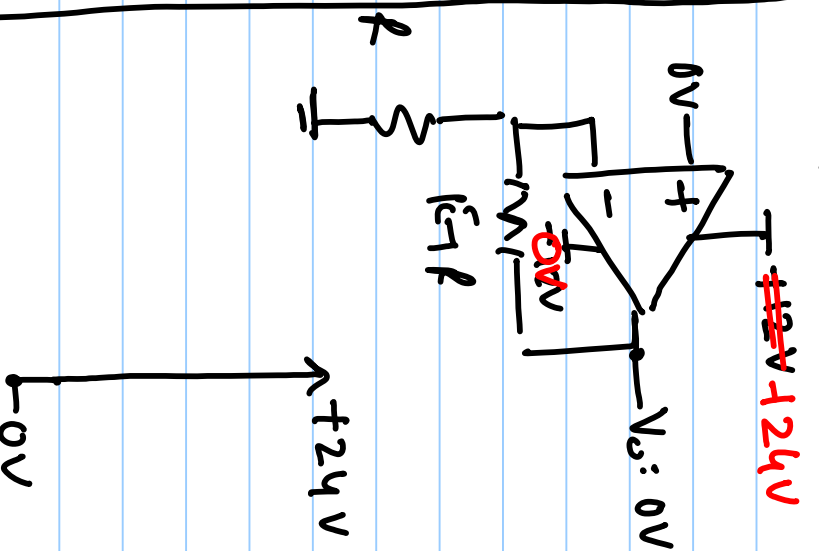
$$V_{SS} = \frac{R_b}{R_b + R_a} (V_{DD} + V_{SS})$$



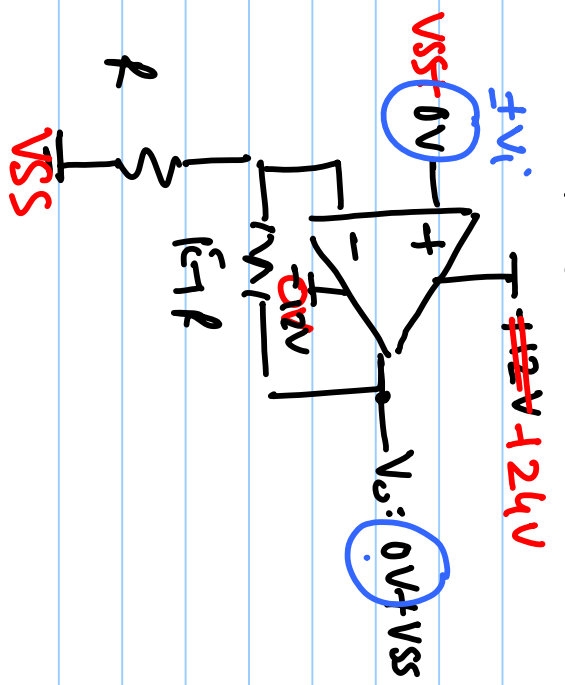
#1

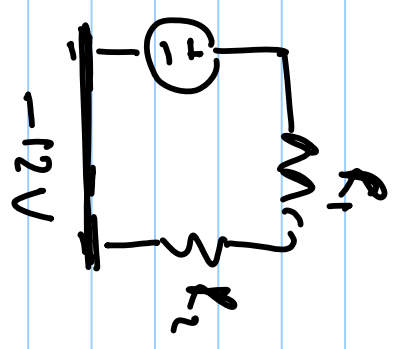
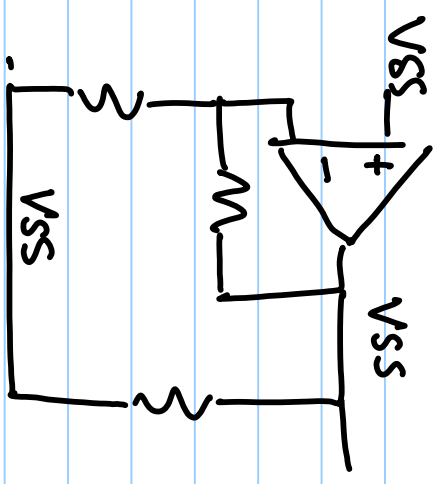
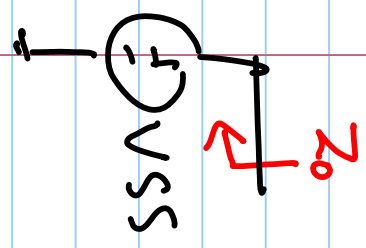
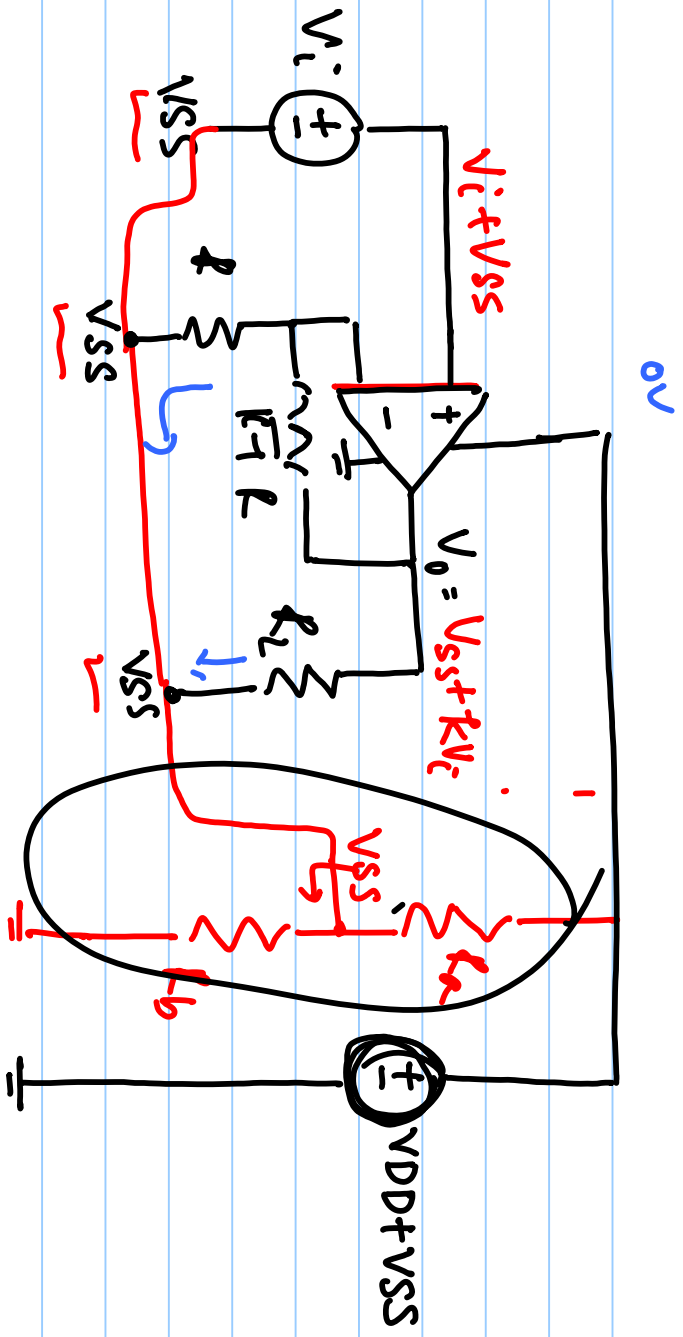


~~#2~~



#3

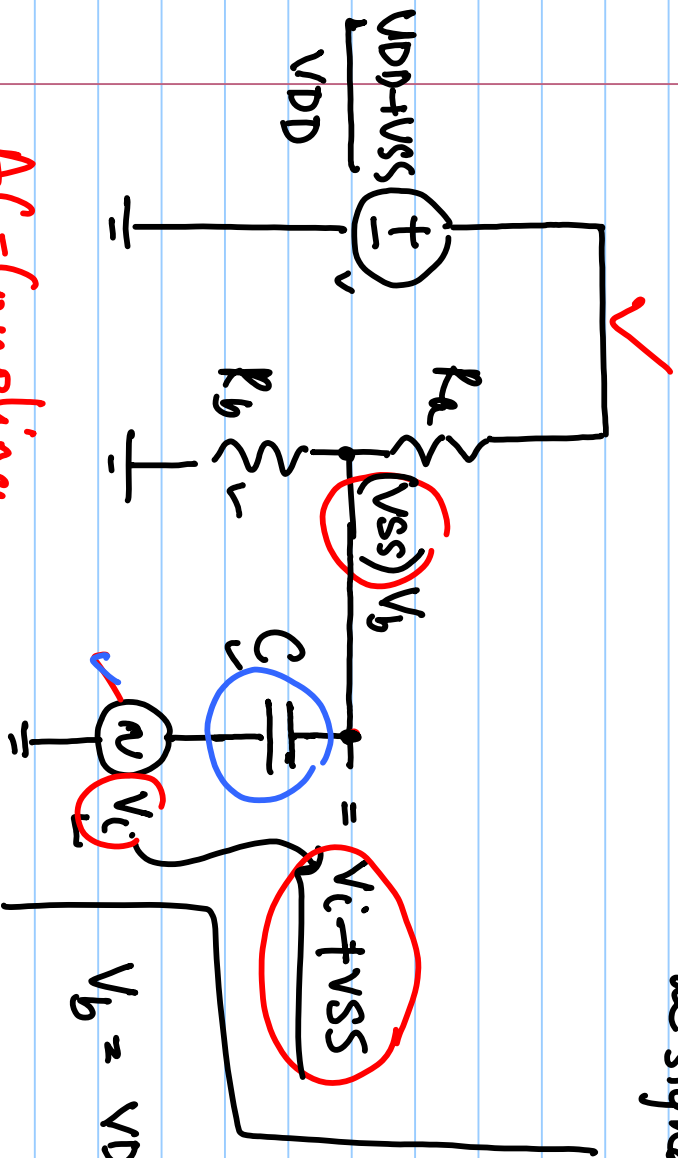




$$V_{SS} + V_i = \underbrace{V_{SS}}_{\text{bias signal}} + V_i$$

de signal it can be de signal
 bias signal ac signal
 i/p signal

$$k_g \times \frac{1}{s}$$



AC-Coupling:

$$V_b = V_{DD}(s) \frac{R_b \parallel \frac{1}{sC}}{R_a + R_b \parallel \frac{1}{sC}} + V_i(s) \frac{(R_a \parallel R_b)}{(R_a \parallel R_b) + \frac{1}{sC}}$$

$$V_b = \frac{R_b / (1 + sCR_b)}{R_a + \frac{R_b}{1 + sCR_b}} + \frac{V_i(s) sC (R_a \parallel R_b)}{1 + sC (R_a \parallel R_b)}$$

$$V_b = \underbrace{V_{DD}(s)}_{\text{bias signal}} \frac{R_b}{R_b + R_a} \frac{1}{1 + sC R_b} + \underbrace{V_i(s)}_{\text{ac signal}} \frac{sC (R_a \parallel R_b)}{s(R_a \parallel R_b) + 1}$$

$$V_b = V_{DD} \cdot s(b) \frac{R_b}{R_b + R_a} \frac{1}{1 + sC(R_b || R_a)}$$

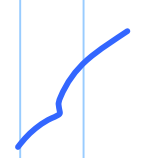
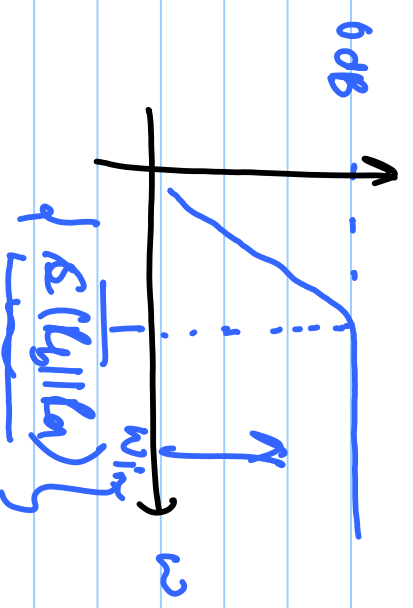
$$\frac{sC(R_b || R_a)}{1 + sC(R_b || R_a)} \approx 1$$

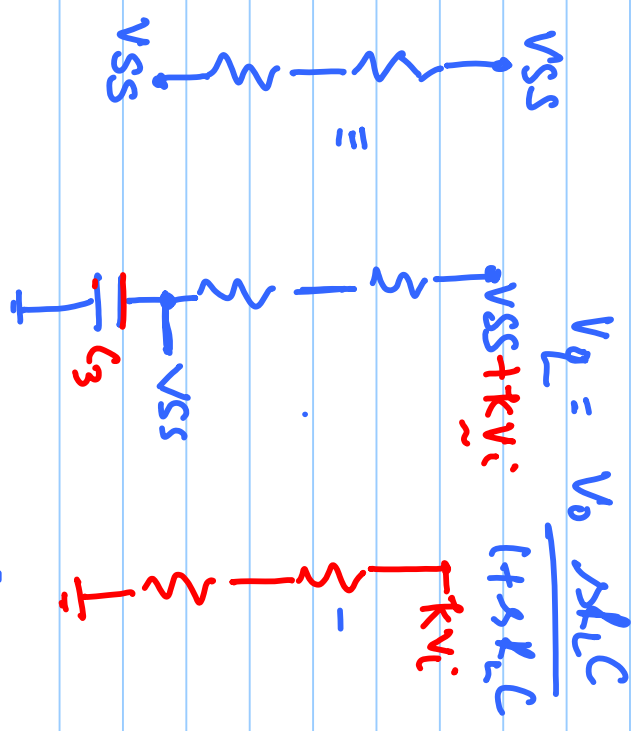
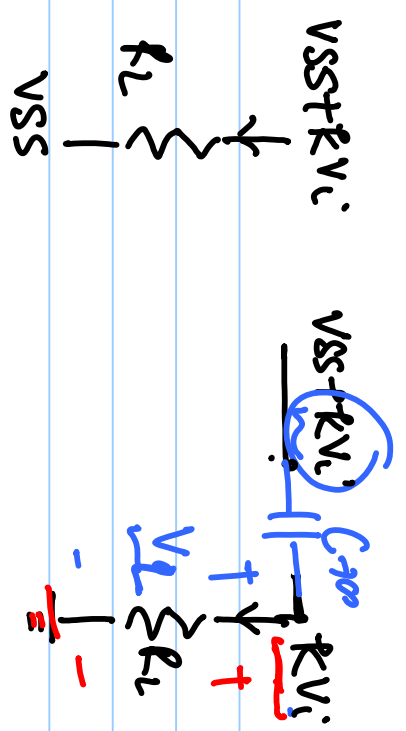
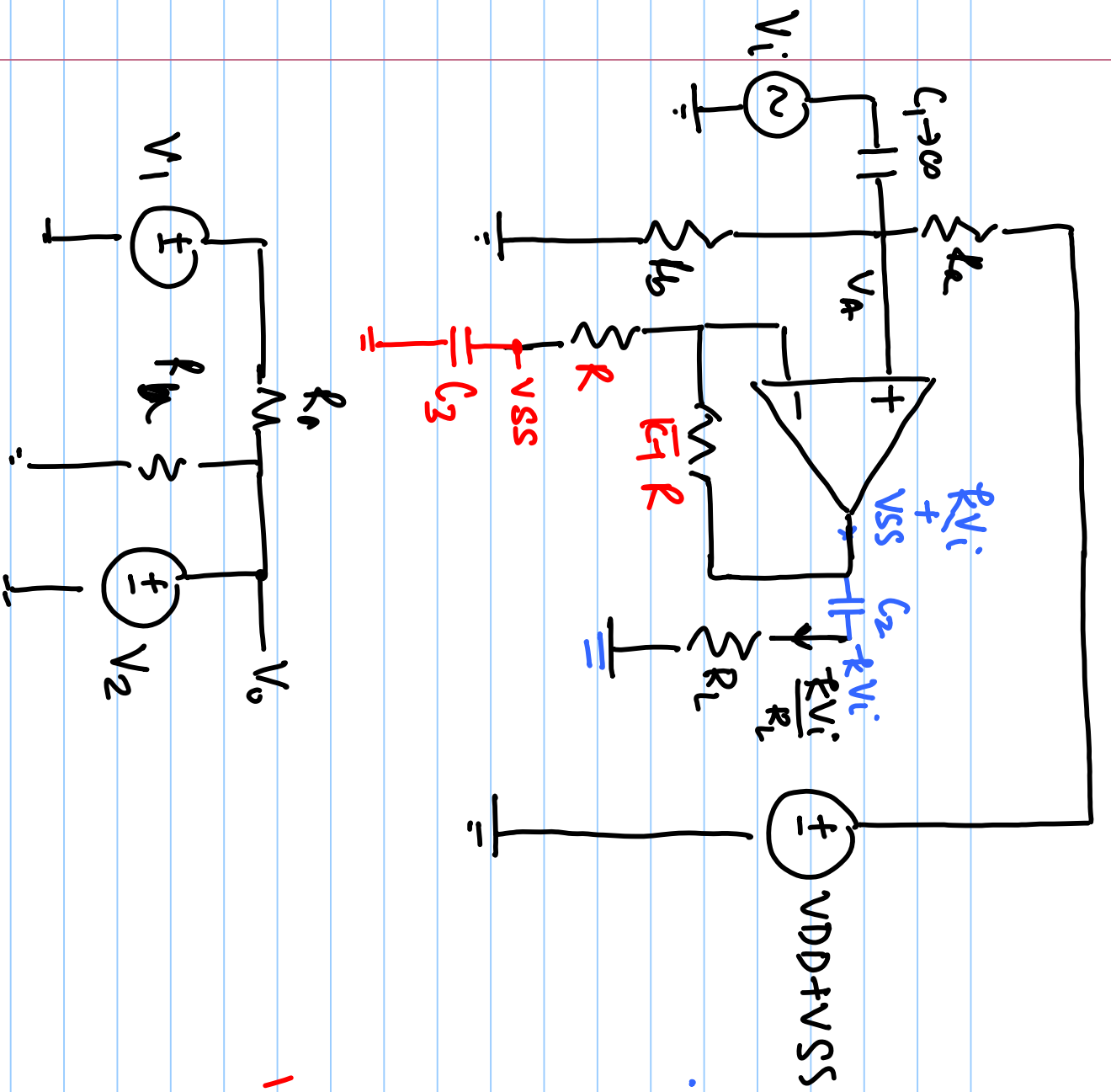
$$\Rightarrow sC(R_b || R_a) \gg 1$$

$$sC(R_b || R_a) = 10 \checkmark$$

$$C \gg \frac{1}{\omega_{in}(R_b || R_a)}$$

$$\approx 1 + \underbrace{V_i(s)}_{\approx V_i} \left(\frac{sC(R_b || R_a)}{1 + sC(R_b || R_a)} \right) \approx V_i$$





$$V_o = V_i \frac{R_L}{(1+sR_L C)}$$

