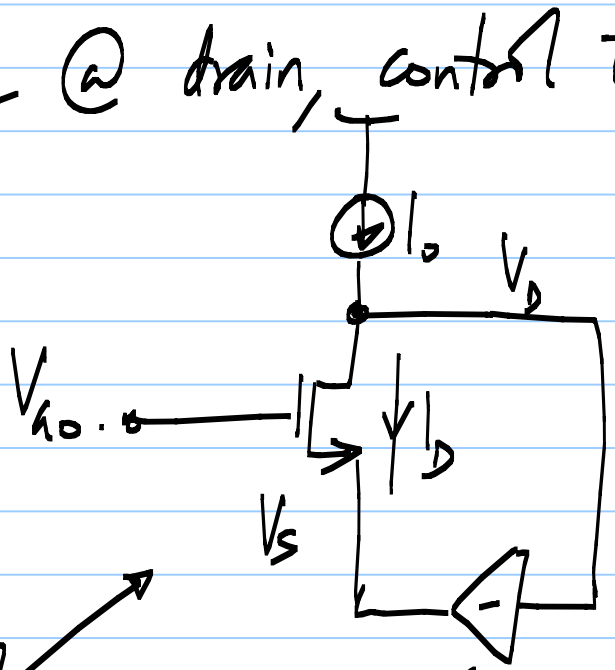
Biasing the transistor:

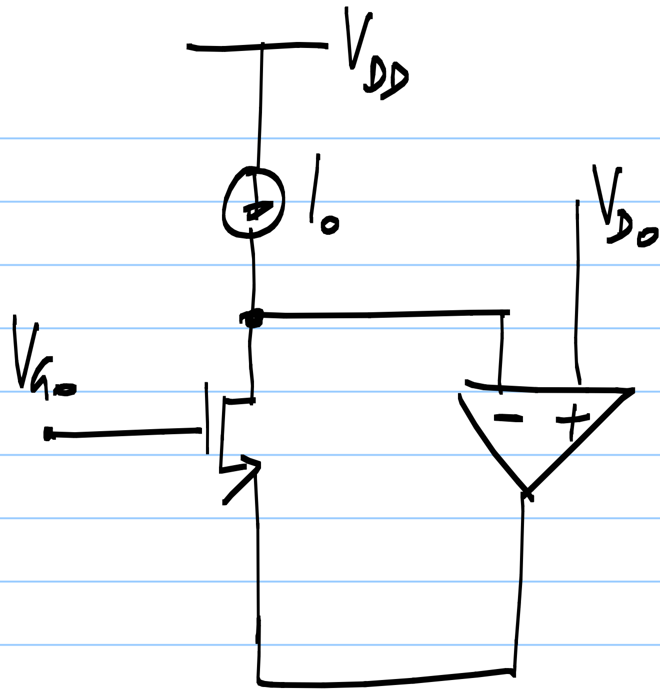
Sense @ drain, control the source



	$I_D > I_o$	$I_D < I_o$
V_D	decrease	increases
V_S must	increase	decrease

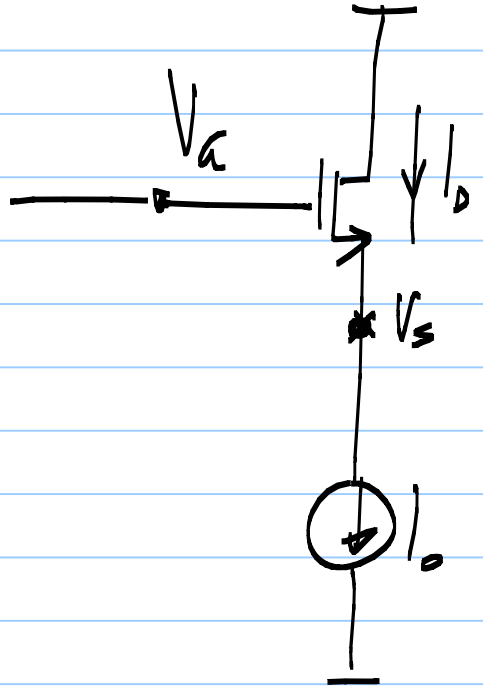
$$V_{GO} - V_t - \sqrt{\frac{2I_o}{\mu C_{ox}\frac{W}{L}}}$$

negative incremental gain

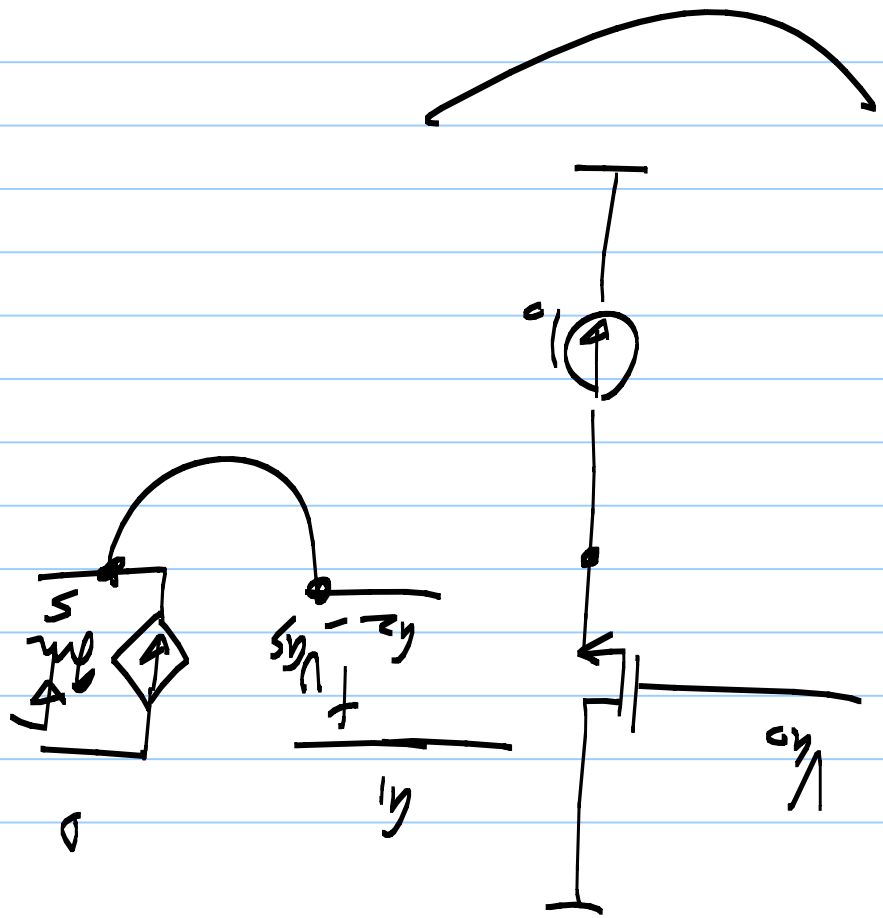


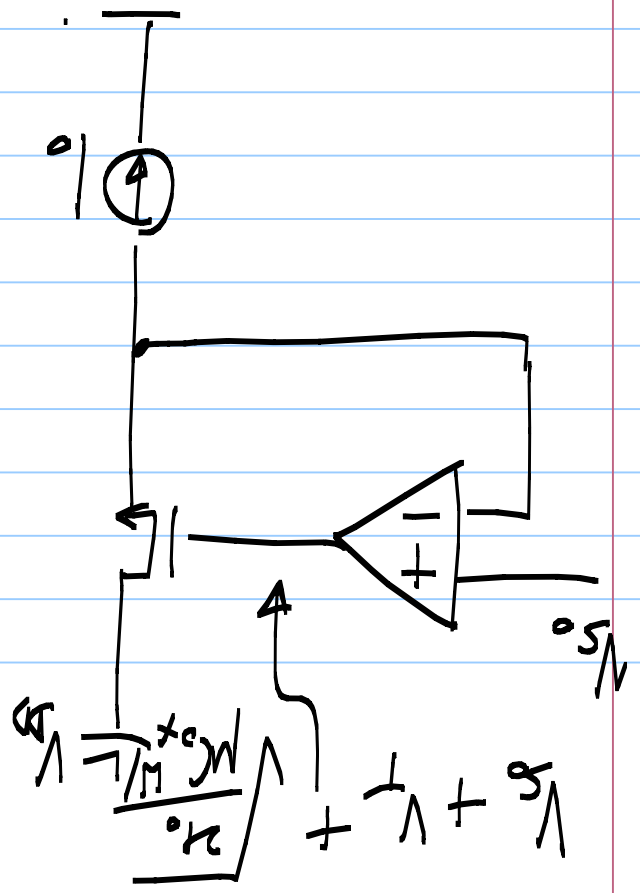
$$V_{D0} > V_{G0} - V_T$$

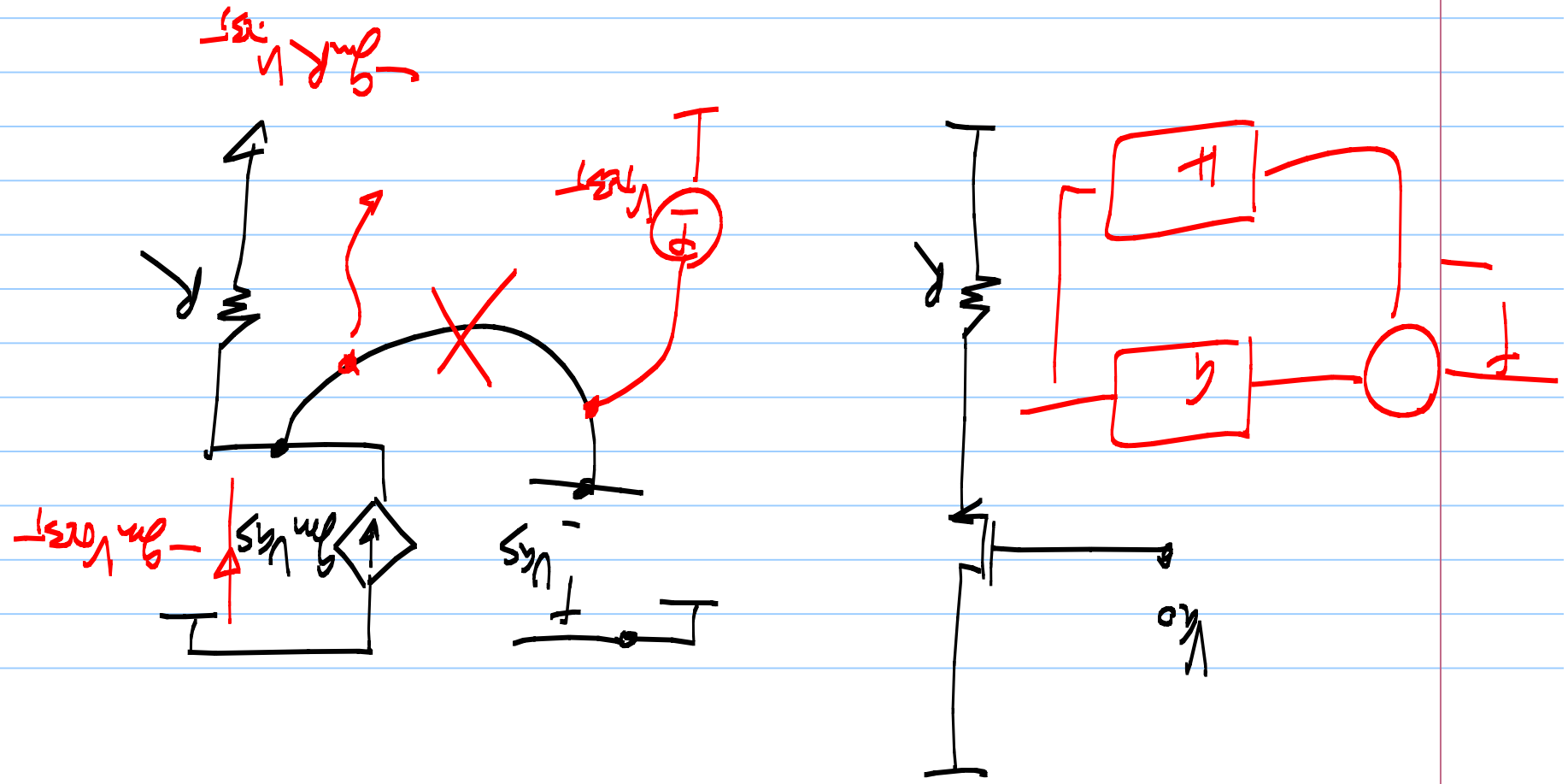
Sense @ source & feedback to the gate

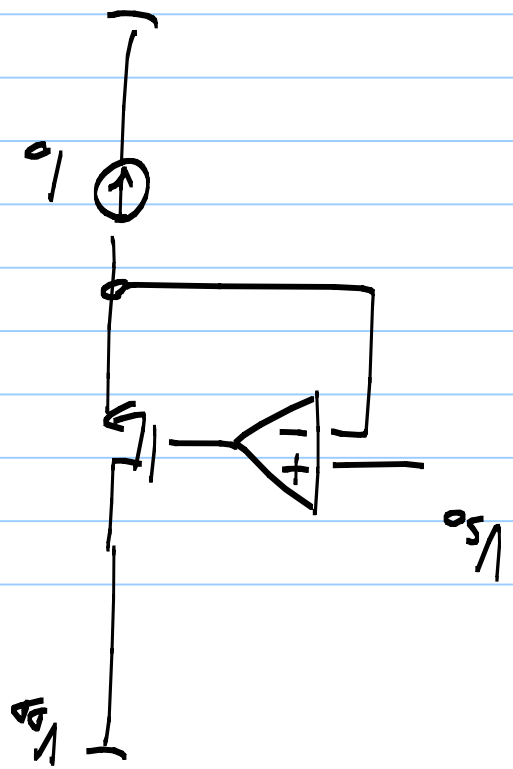


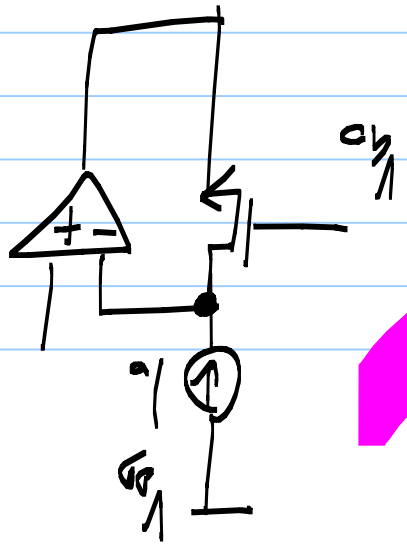
	$I_D > I_o$	$I_D < I_o$
V_S	increase	decrease
V_G must	decrease	

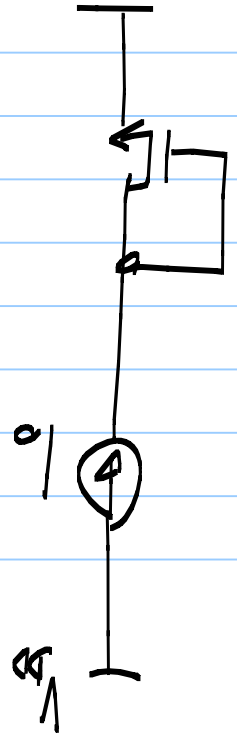


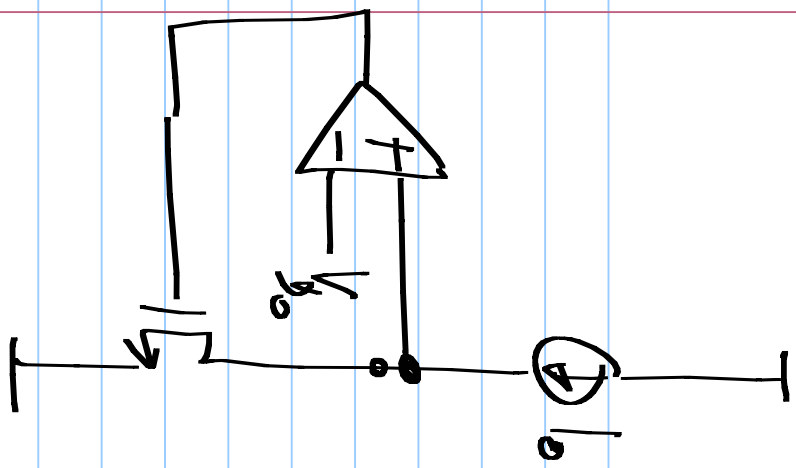




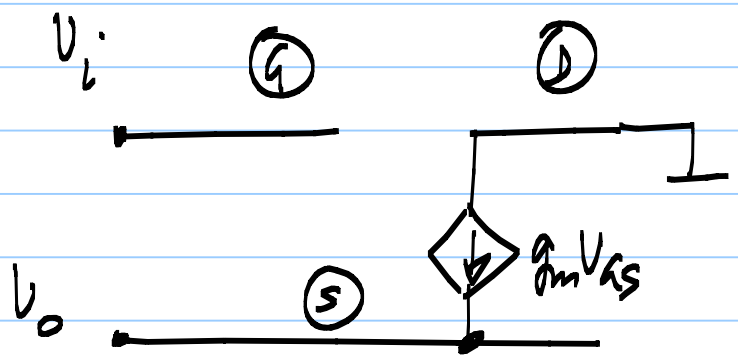


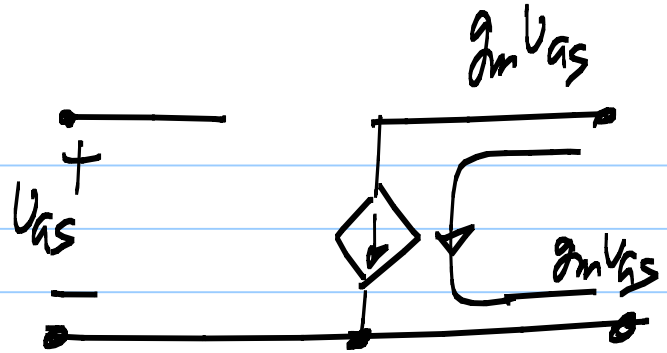






VCVS: $v_o = v_i$



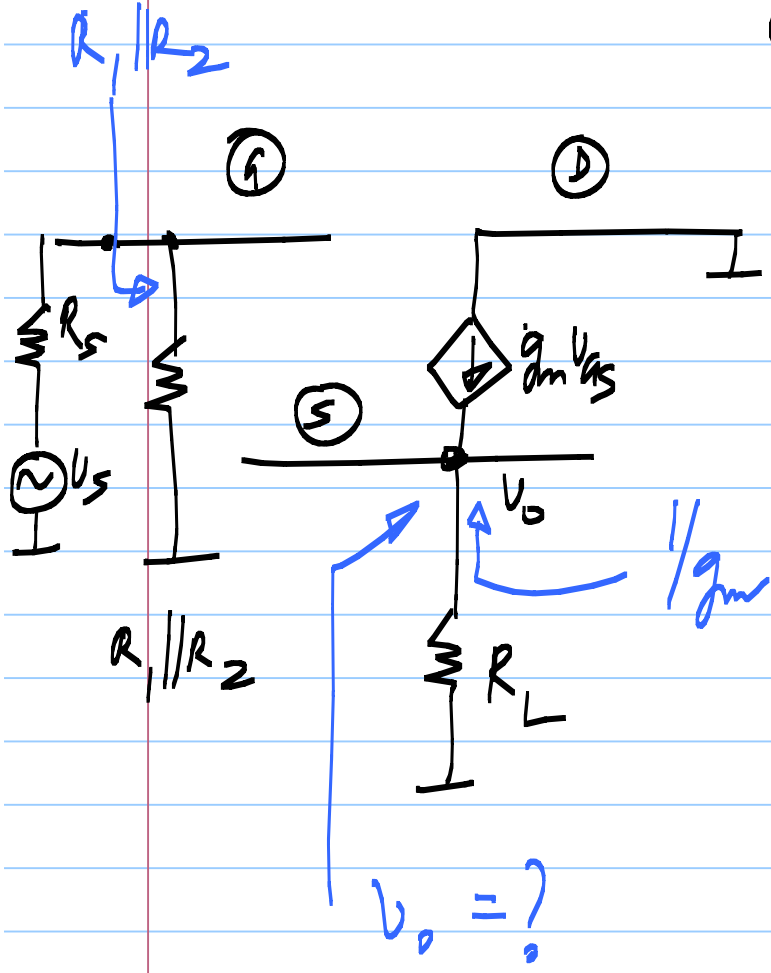


If $v_i > v_o$: current flows into the source node — increases v_o

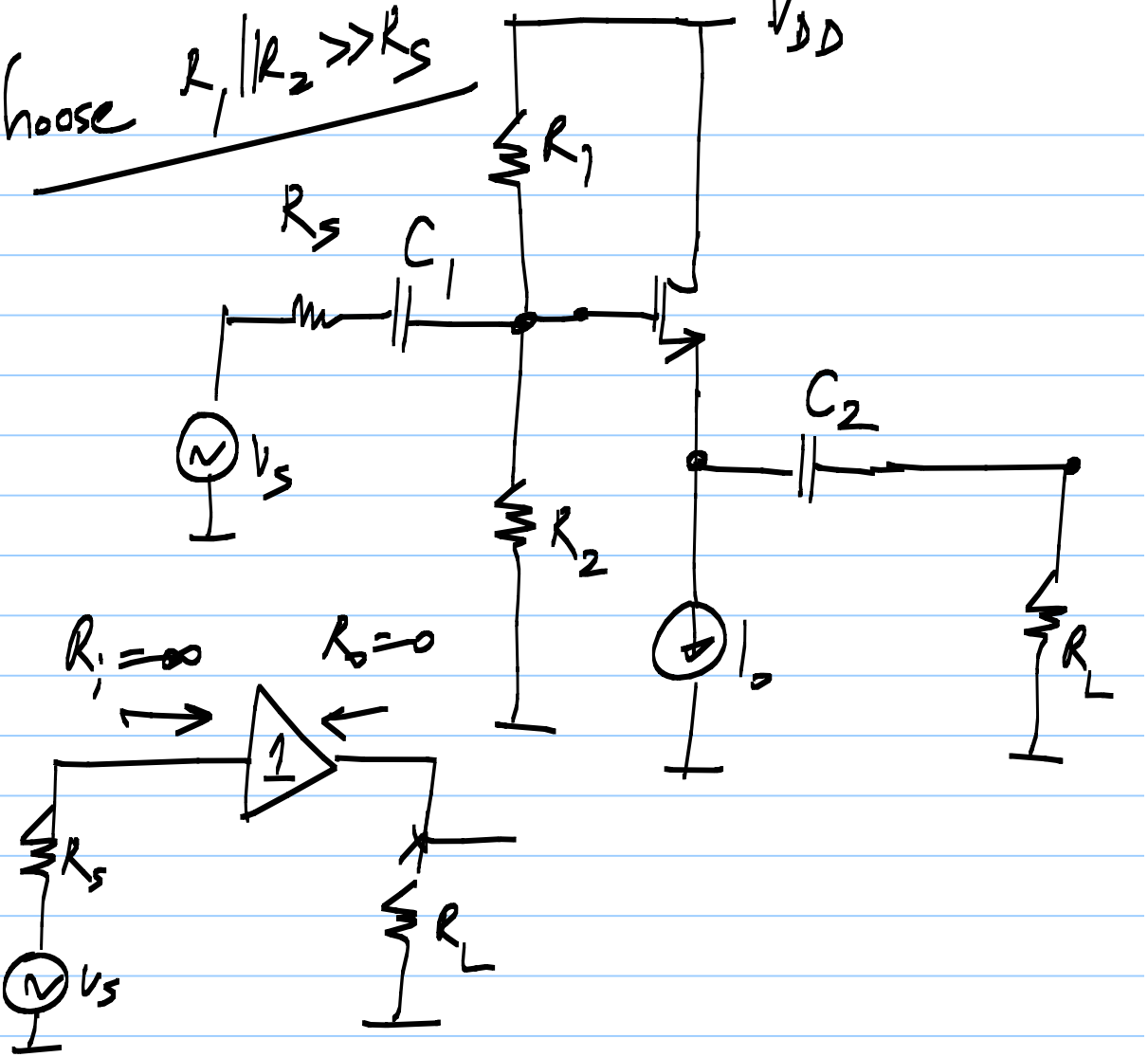
$v_i < v_o$: " out of the source node — reduces v_o

VCVS:

$v_o = v_i$



Choose $R_1 \| R_2 \gg R_s$



$$\frac{v_o}{v_s} = \frac{R_1 \| R_2}{R_1 \| R_2 + R_s} \cdot \frac{g_m R_L}{1 + g_m R_L}$$

$$g_m R_L \gg 1$$