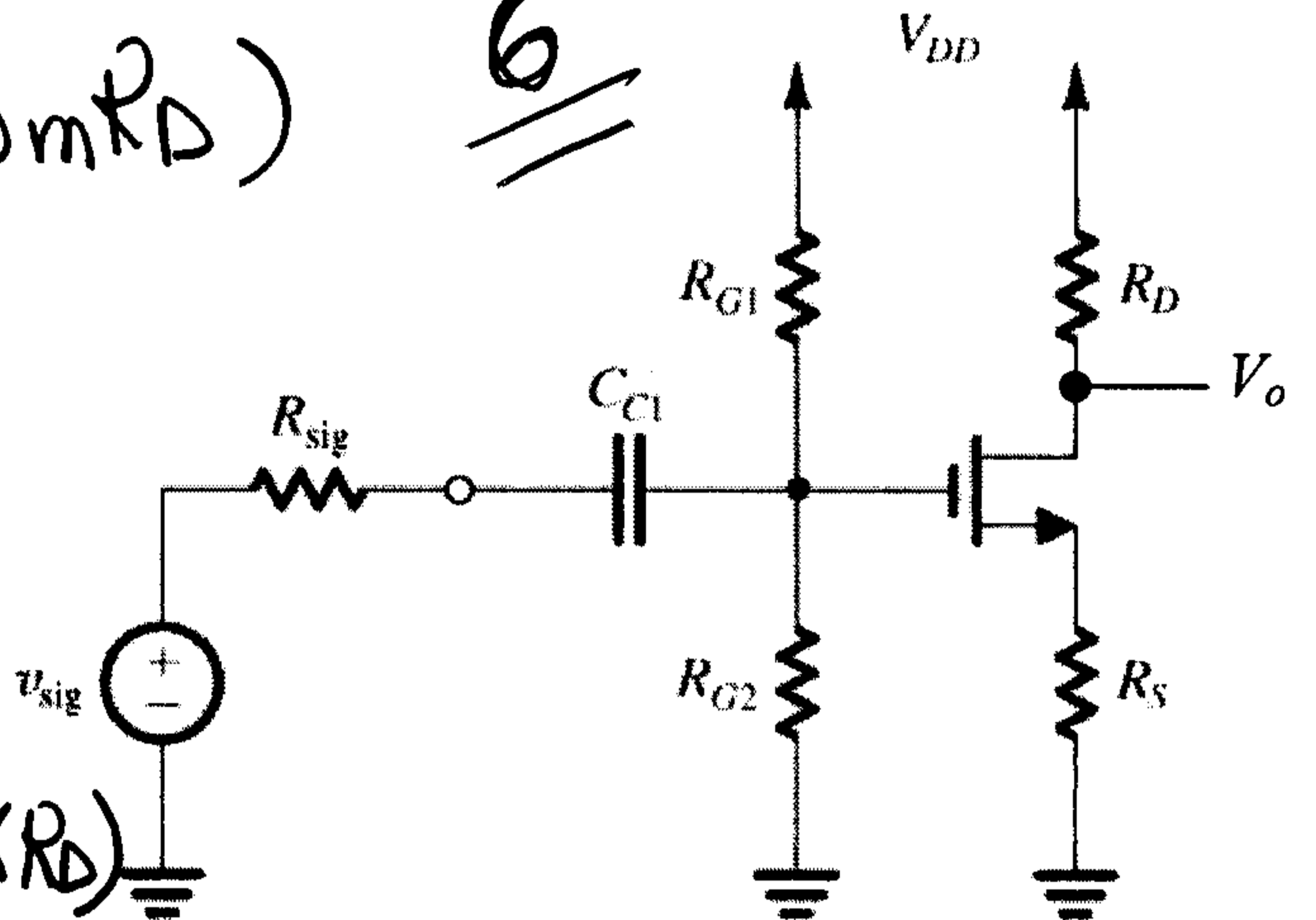


For the amplifier shown below, find the voltage gain $A_v = v_o/v_{sig}$. Given that $g_m = 1\text{mA/V}$, $R_{sig} = 100\text{k}\Omega$, $R_{G1} = R_{G2} = 200\text{k}\Omega$, **design the amplifier circuit to achieve A_v of 5V/V**

$$\frac{V_o}{V_{sig}} = \frac{V_g}{V_{sig}} \frac{V_{gs}}{V_g} \frac{V_o}{V_{gs}}$$

$$= \frac{R_{G1} \parallel R_{G2}}{(R_{G1} \parallel R_{G2}) + R_{sig}} \frac{\frac{1}{g_m}}{R_s + \frac{1}{g_m}} (-g_m R_D) \quad \underline{\underline{6}}$$



3 *

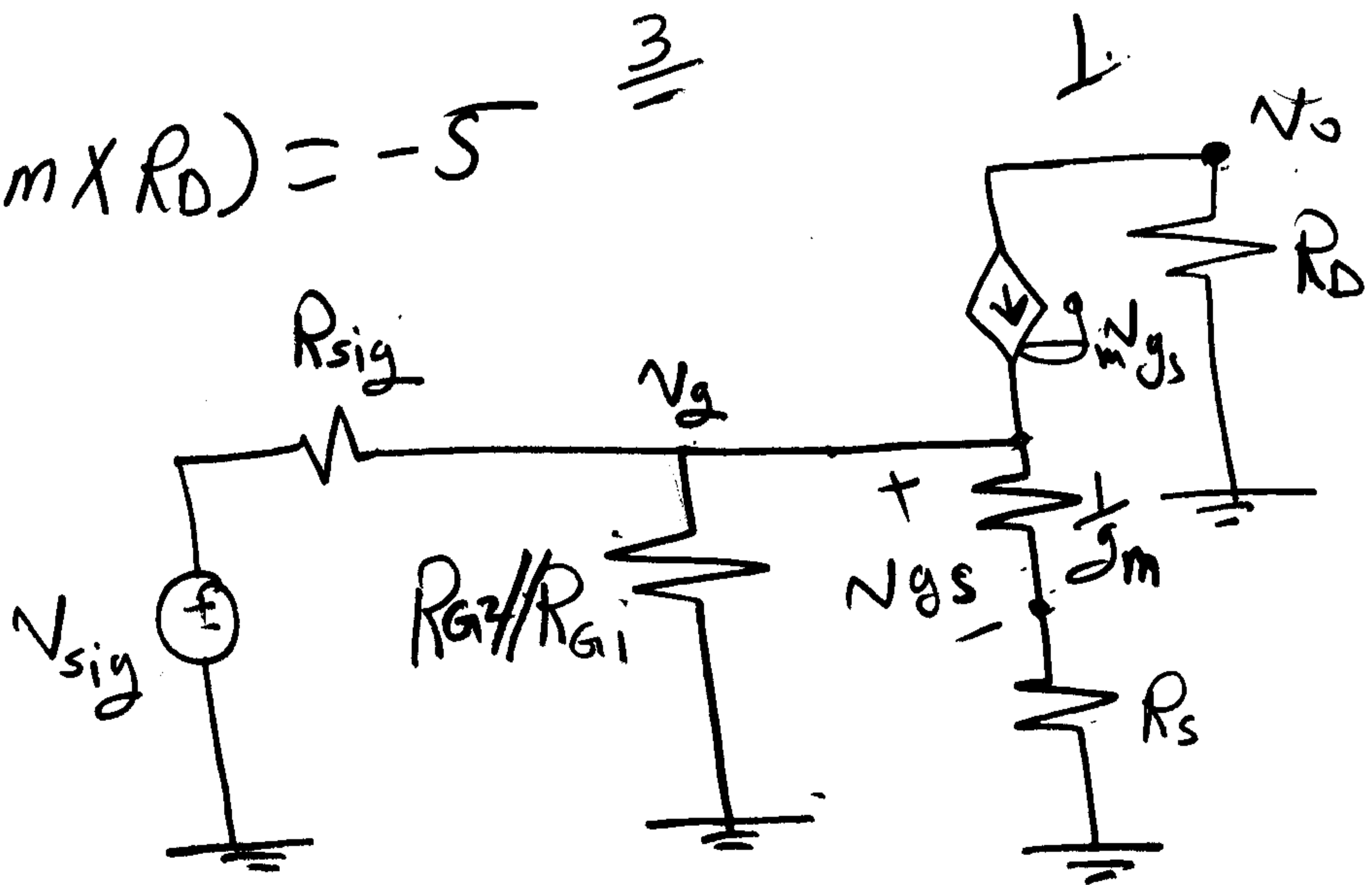
$$\frac{V_o}{V_{sig}} = \frac{200\text{k} / 200\text{k}}{(200\text{k} / 200\text{k}) + 100\text{k}} \frac{1\text{k}}{R_s + 1\text{k}} (-1\text{m} \times R_D)$$

$$= \frac{1}{2} \frac{1\text{k}}{R_s + 1\text{k}} (-1\text{m} \times R_D) = -5 \quad \underline{\underline{3}}$$

select :

$$R_D = 20\text{k}$$

$$R_s = 1\text{k}$$



$$\frac{V_o}{V_{sig}} = -5 \text{ V/V}$$