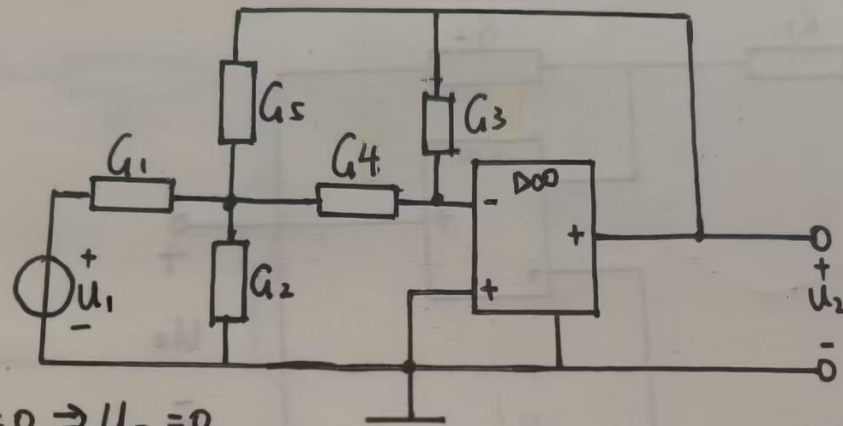


电路作业（五）

5—3



$$U_+ = 0 \Rightarrow U_- = 0$$

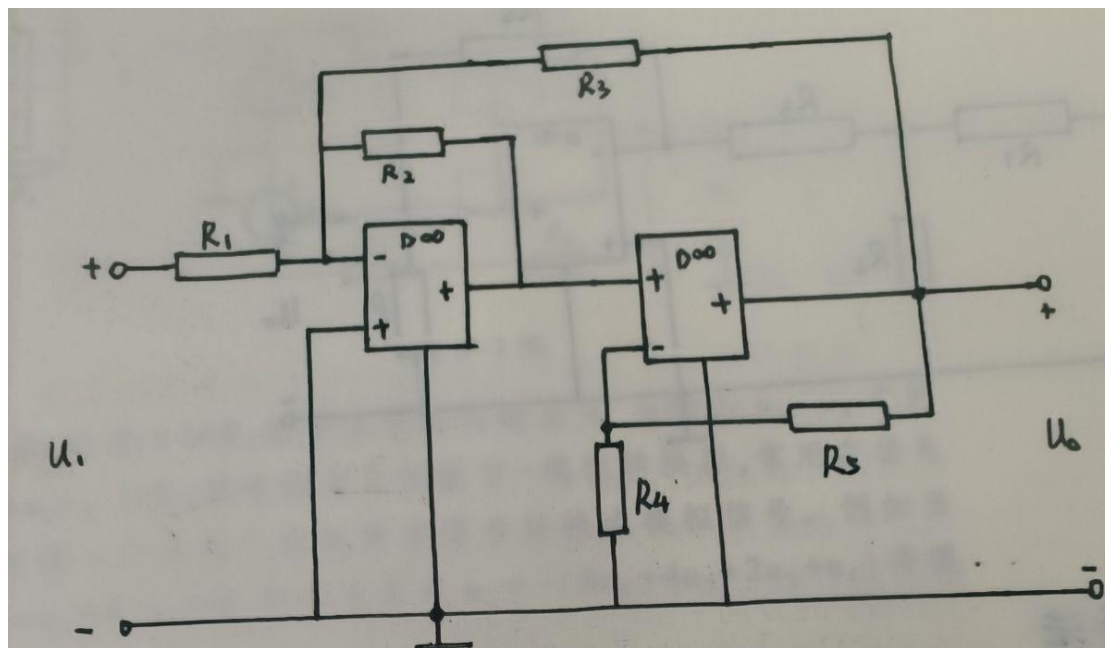
$$i_+ = i_- = 0$$

用节点电压法

$$\begin{cases} (U_{n1} - U_1)G_1 + (U_{n1} - U_{n2})G_4 + U_{n1}G_2 + (U_{n1} - U_2)G_5 = 0 \\ (U_{n2} - U_{n1})G_4 + (U_{n2} - U_2)G_3 = 0 \\ U_{n2} = 0 \end{cases}$$

$$\Rightarrow \frac{U_2}{U_1} = - \frac{G_1 G_4}{(G_1 + G_2 + G_4 + G_5)G_3 + G_4 G_5}$$

5—4



$$U_{+1} = 0$$

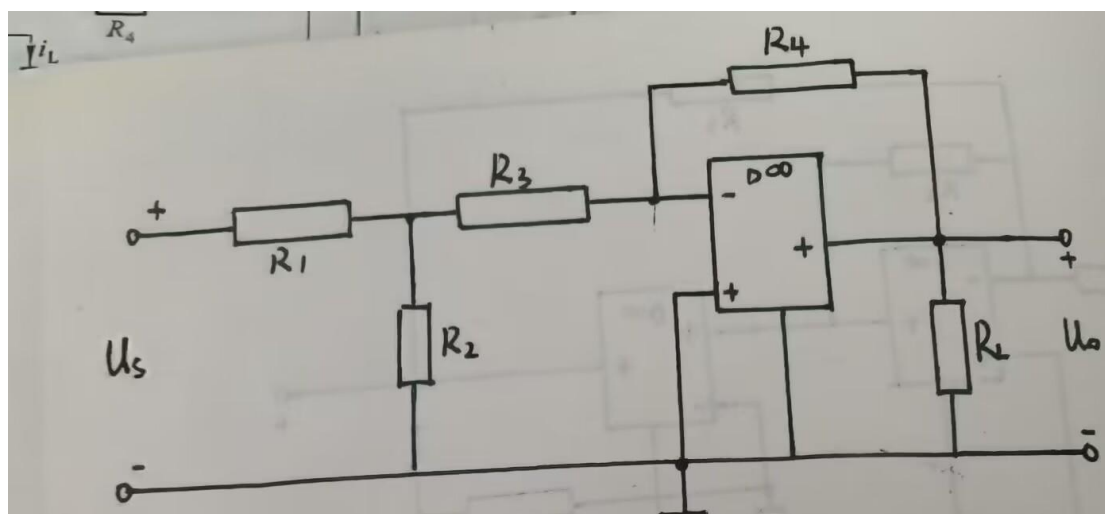
$$\therefore U_{-1} = 0$$

$$U_{-2} = U_{n2}$$

$$\therefore U_{+2} = U_{n2}$$

$$\begin{cases} \frac{U_{n1} - U_1}{R_1} + \frac{U_{n1} - U_0}{R_3} + \frac{U_{n1} - U_{n2}}{R_2} = 0 \\ \frac{U_{n2}}{R_4} + \frac{U_{n2} - U_0}{R_5} = 0 \\ U_{n1} = 0 \end{cases}$$

$$\Rightarrow \frac{U_0}{U_1} = - \frac{R_2 R_3 (R_4 + R_5)}{R_1 (R_2 R_4 + R_2 R_5 + R_3 R_4)}$$



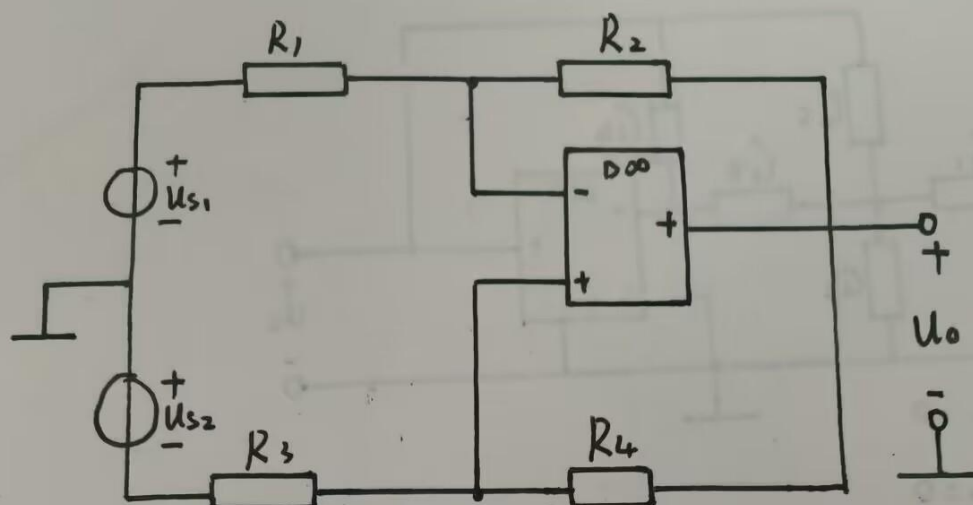
$$U_+ = 0$$

$$\therefore U_- = 0$$

结点电压法

$$\begin{cases} \frac{U_{n1}}{R_2} + \frac{U_{n1} - U_{n2}}{R_3} + \frac{U_{n1} - U_s}{R_1} = 0 \\ \frac{U_{n2} - U_{n1}}{R_3} + \frac{U_{n2} - U_o}{R_4} = 0 \\ U_{n2} = 0 \end{cases}$$

$$\Rightarrow \frac{U_o}{U_s} = - \frac{R_2 R_4}{R_1 R_2 + R_1 R_3 + R_2 R_3}$$



节点电压法

$$\begin{cases} \frac{U_{n1} - U_{s1}}{R_1} + \frac{U_{n1} - U_o}{R_2} = 0 \\ \frac{U_{n2} + U_{s2}}{R_3} + \frac{U_{n2} - U_o}{R_4} = 0 \\ U_{n1} = U_{n2} \end{cases}$$

$$\Rightarrow U_o = \frac{(R_2 R_4 + R_2 R_3) U_{s1} + (R_2 R_4 + R_1 R_4) U_{s2}}{R_2 R_3 - R_1 R_4}$$