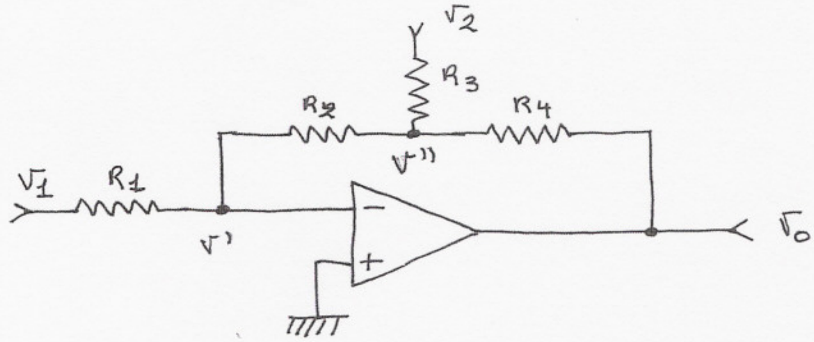
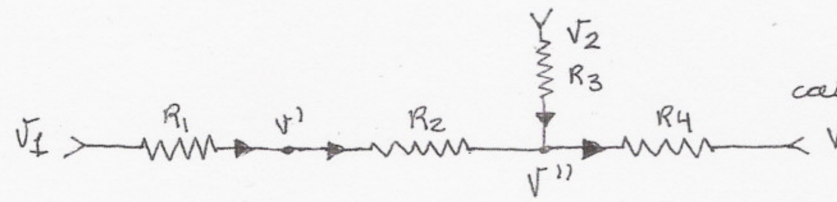
EAN1

2.1)



Determine V_o em função de V_1 e V_2



caso possível de correntes

para V_1 e V_2 qual a tensão V_o de modo a manter $V' = 0\,V$?

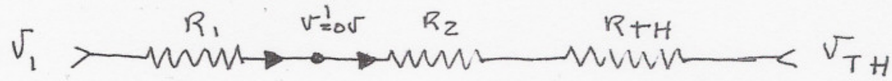
$$V_{TH} = \frac{V_2 - V_o}{(R_3 + R_4)} \cdot R_4 + V_o$$

ou

$$V_{TH} = \frac{V_o - V_2}{(R_3 + R_4)} \cdot R_3 + V_2$$

e

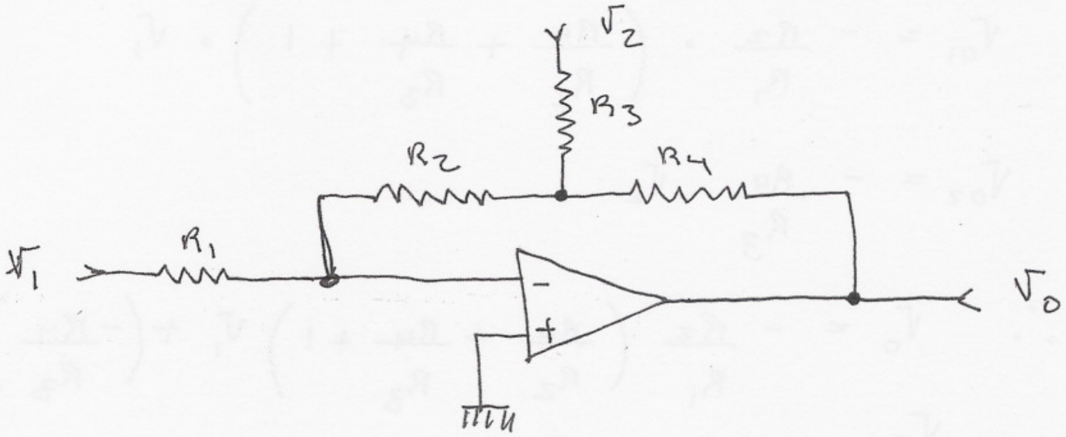
$$R_{TH} = \frac{R_3 \cdot R_4}{(R_3 + R_4)}$$



$$\frac{V_{TH} - V_1}{(R_1 + R_2 + R_{TH})} \cdot R_1 + V_1 = 0$$
$$= V'$$

EAN 1

2.1)



$$V_0 = f(V_1, V_2)$$

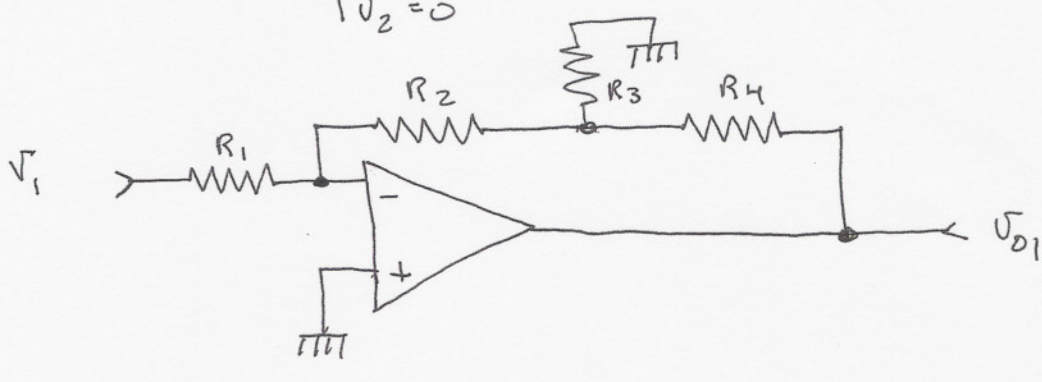
granda pedrceda.

$$V_0 = V_{01} + V_{02}$$

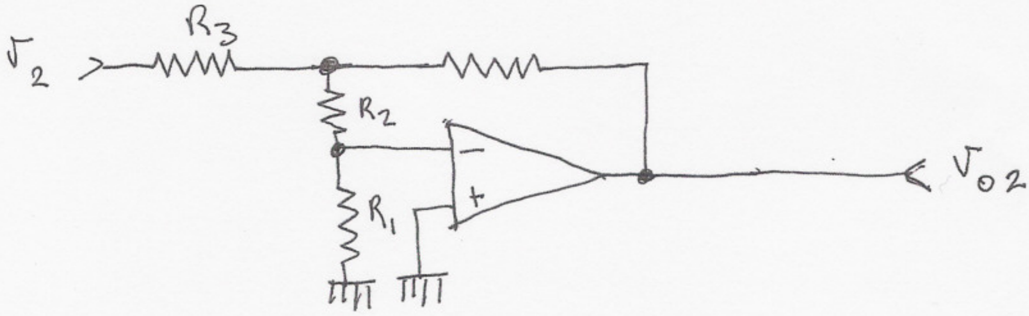
$$V_{01} = f(V_1)\Big|_{V_2=0}$$

$$V_{02} = f(V_2)\Big|_{V_1=0}$$

1.° $V_{01} = f(V_1)\Big|_{V_2=0}$



$$V_{02} = f(V_2)\Big|_{V_1=0}$$



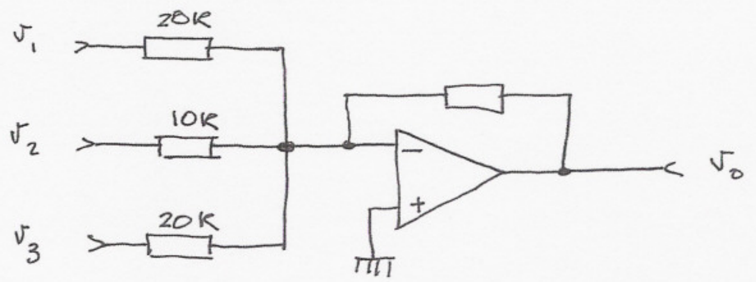
2.1) $V_{01} = -\frac{R_2}{R_1} \cdot \left(\frac{R_4}{R_2} + \frac{R_4}{R_3} + 1 \right) \cdot V_1$

$V_{02} = -\frac{R_4}{R_3} \cdot V_2$

$\therefore \quad V_0 = -\frac{R_2}{R_1} \left(\frac{R_4}{R_2} + \frac{R_4}{R_3} + 1 \right) V_1 + \left(-\frac{R_4}{R_3} \right) \cdot V_2$

EAN 1.

2.2)

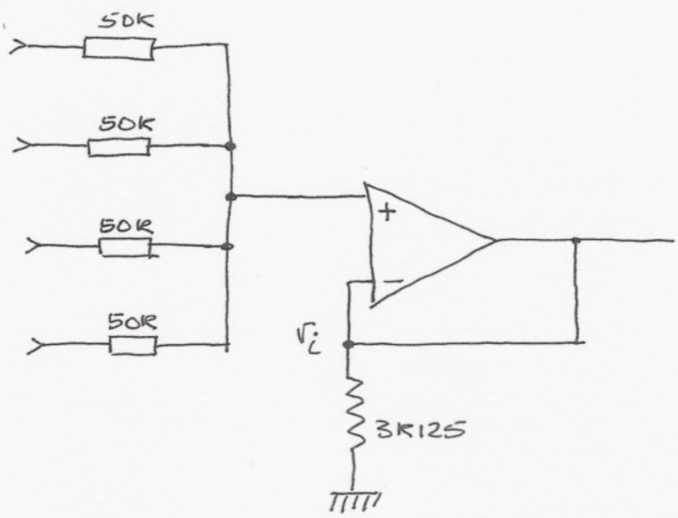


$v_{o1} = -v_1$

$$v_{o2} = -\frac{R}{R_2} \cdot v_2 = -2\,v_2 \quad \Rightarrow R = 20\,k\Omega.$$

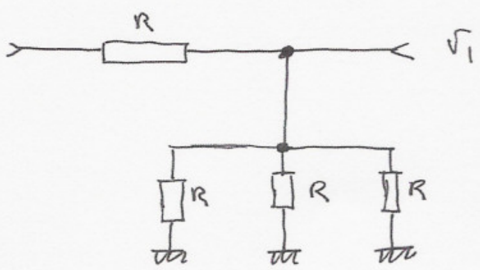
EAN 1

2.3) $V_o = \frac{1}{4} \left(V_1 + V_2 + V_3 + V_4 \right)$



$$V' = V_1' + V_2' + V_3' + V_4'$$

$V_1' = V_1$



$$V_1 = \frac{\frac{1}{3} R}{\frac{1}{3} R + R}.$$

$\Rightarrow$
$$V_1' = \frac{1}{4} V_1$$
$$V_2' = \frac{1}{4} V_2$$
$$V_3' = \frac{1}{4} V_3$$
$$V_4' = \frac{1}{4} V_4.$$

EAW1 Prácticas 8/3/2004

③

2.4)

$$V_0 = 2V_1 - 3V_2$$

$$V_0 = R_2 I_f + R_4 I_4$$
$$V_2 = R_1 I_f + R_4 I_4$$
$$V_1 = R_3 I_3 + R_4 I_4$$

$\begin{cases} V_1 \neq 0 \\ V_2 = 0 \end{cases}$ $\quad V_1' = \dfrac{R_4}{R_3 + R_4} V_1$

$$0 - V_1' = \frac{V_1' - V_2}{R_2}$$

$$\frac{-R_2}{R_1} = \frac{V_1' - V_0}{V_1} \Leftrightarrow -1 - \frac{R_2}{R_1} = -\frac{V_0}{V_1'}$$

$$\frac{V_0}{V_1'} = 1 + \frac{R_2}{R_1}$$

$$\frac{V_0}{\frac{R_4}{R_3 + R_4} V_1} = 1 + \frac{R_2}{R_1}$$

$$V_{01} = \left(1 + \frac{R_2}{R_1}\right)\left(\frac{R_4}{R_3 + R_4}\right) V_1$$

$\begin{cases} V_1 = 0 \\ V_2 \neq 0 \end{cases}$ $\quad V_{02} = -\dfrac{R_2}{R_1} V_2$

$$V_0 = \left(1 + \frac{R_2}{R_1}\right)\left(\frac{R_4}{R_3 + R_4}\right) V_1 - \frac{R_2}{R_1} V_2$$

$$-\frac{R_2}{R_1} = -3$$

$$\frac{R_2}{R_1} = 3 \Leftrightarrow R_2 = 3R_1$$

$$\left(1 + \frac{R_2}{R_1}\right)\left(\frac{R_4}{R_3 + R_4}\right) = 2$$

$$\left(1 + \frac{3\cancel{R_1}}{\cancel{R_1}}\right)\left(\frac{R_4}{R_3 + R_4}\right) = 2$$

$$\frac{4R_4}{R_3 + R_4} = 2$$

$$4R_4 = 2R_3 + 2R_4$$

$$2R_4 = 2R_3$$

$$R_4 = R_3$$

$$R_4 = 1K$$

$$R_3 = 1K$$

$$R_2 = \frac{1}{3}K$$

$$R_1 = 1.$$