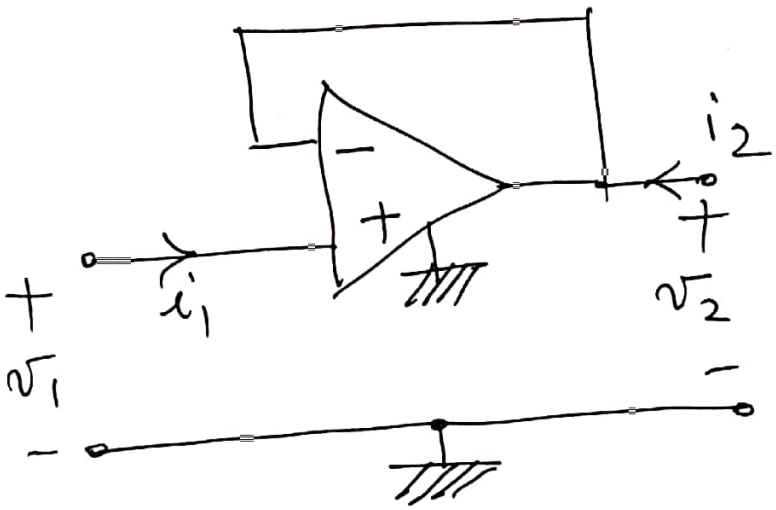
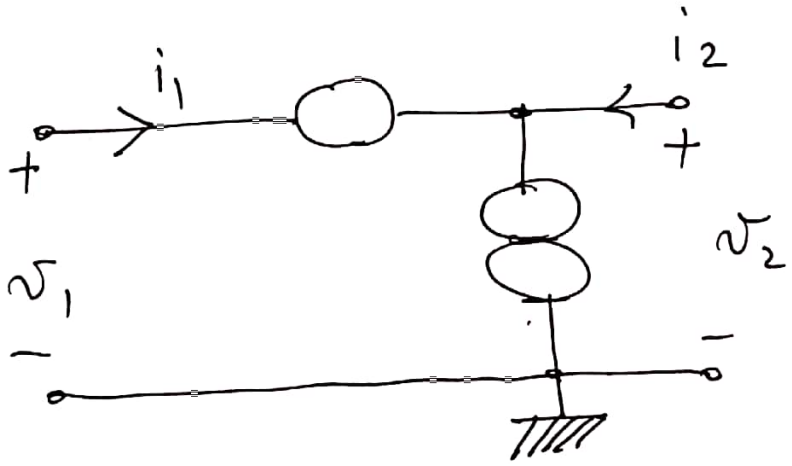
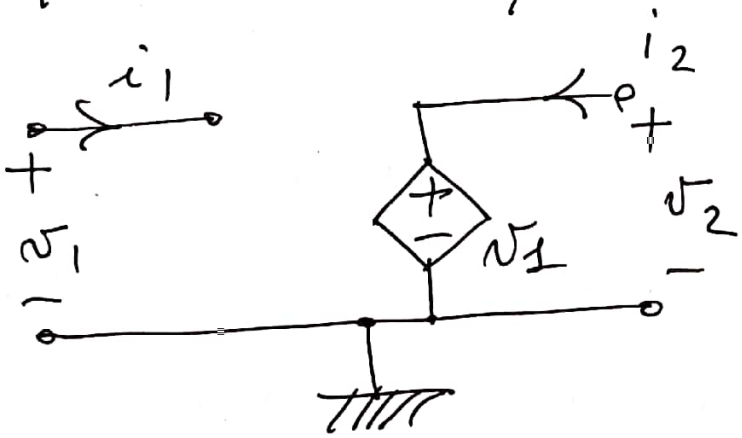
Esempio Circuito separatore (buffer)





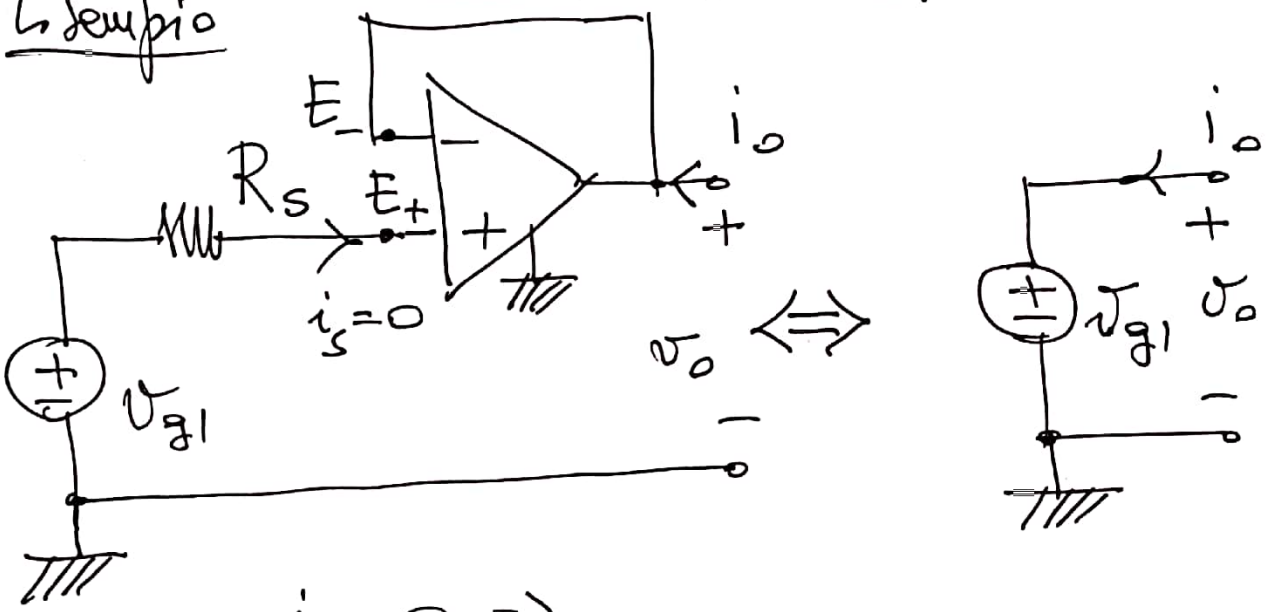
$$\begin{cases} v_2 = v_1 \\ i_1 = 0 \end{cases}$$

relazioni costitutive



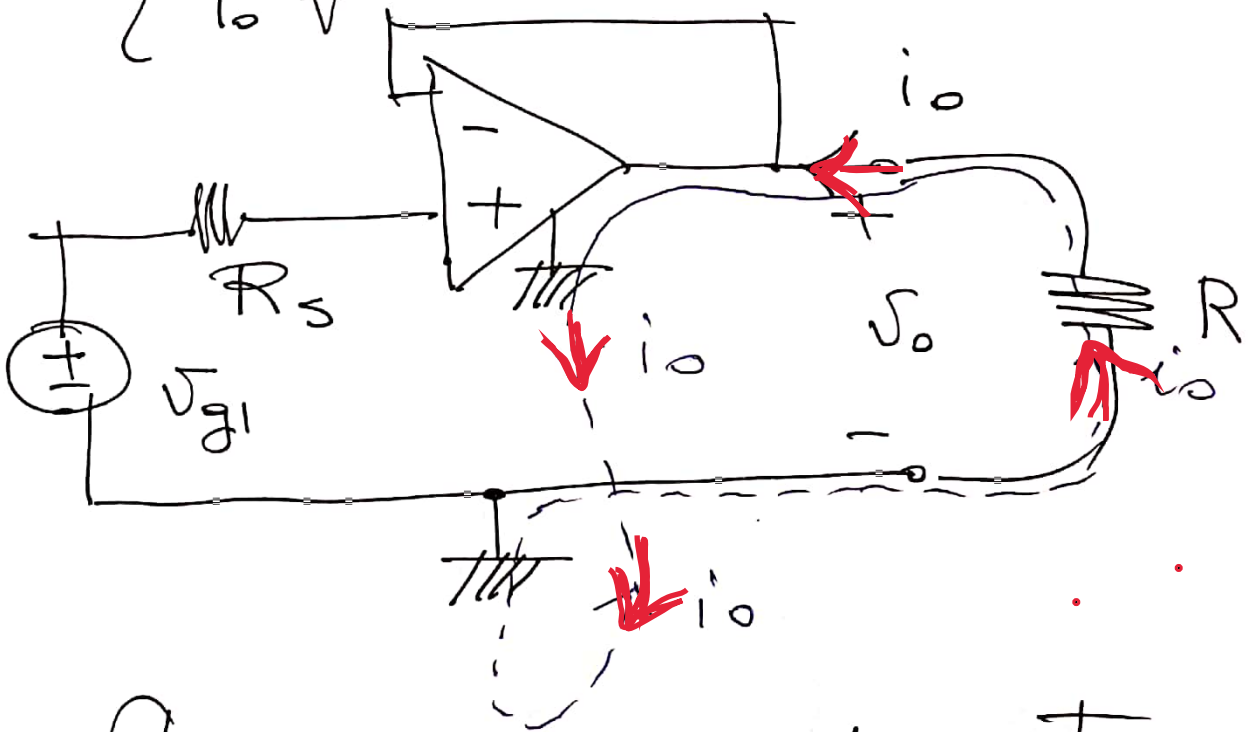
Impiego c.to ripetitore

Esempio



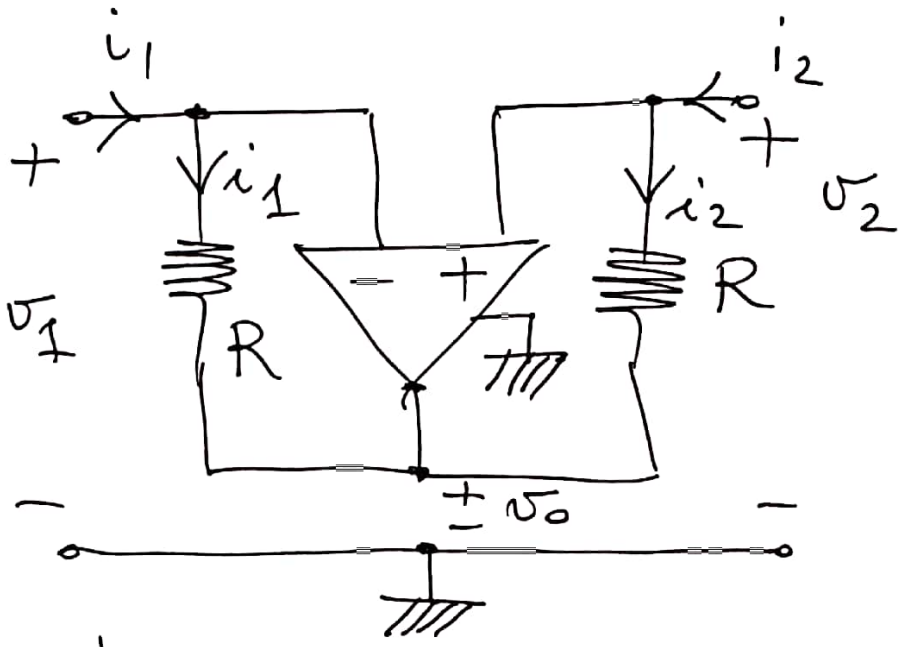
$i_s = 0 \Rightarrow$

$$\begin{cases} v_o = E_- = E_+ = v_{g1} \\ i_o \ \forall \end{cases}$$



Notare la circolazione di corrente nel circuito.

Inverritore di corrente (I-NIC)

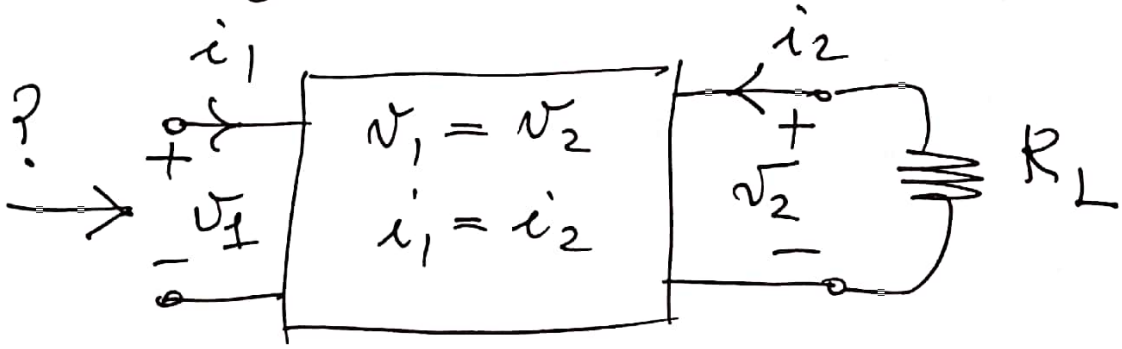


Si ha: $v_1 = v_2$

$$i_1 = \frac{v_1 - v_o}{R} \; ; \quad i_2 = \frac{v_2 - v_o}{R}$$

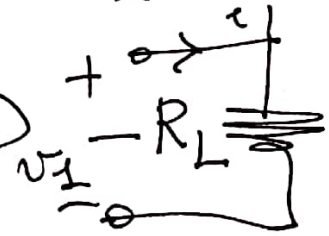
$$\Rightarrow \quad i_1 = i_2$$

$$\Rightarrow \begin{cases} v_1 = v_2 \\ i_1 = i_2 \end{cases} \quad \text{I-NIC}.$$

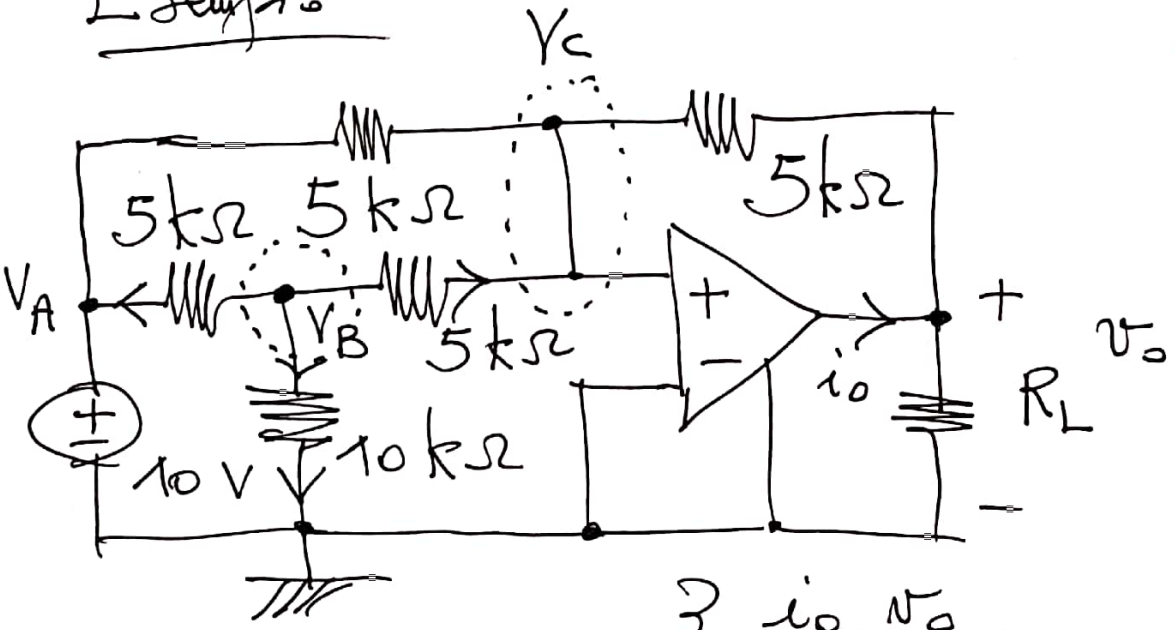


$$\frac{v_1}{i_1} = \frac{v_2}{i_2}, \quad \text{ma} \quad v_2 = -R_L i_2.$$

$$\Rightarrow \quad \frac{v_1}{i_1} = -R_L \quad \ldots \Leftrightarrow$$



Esempio



? i_o, v_o.

4 nodi A, B, C, D;
4 incognite V_A, V_B, V_C, V_D
Ma: $V_A = 10\ V$, $V_C = 0$.
$\Rightarrow$ 2 sole incognite V_B e V_o

KCL nodi B e C.

(B) $$\frac{v_B - 10}{5\times10^3} + \frac{v_B}{5\times10^3} + \frac{v_B}{10\times10^3} = 0$$

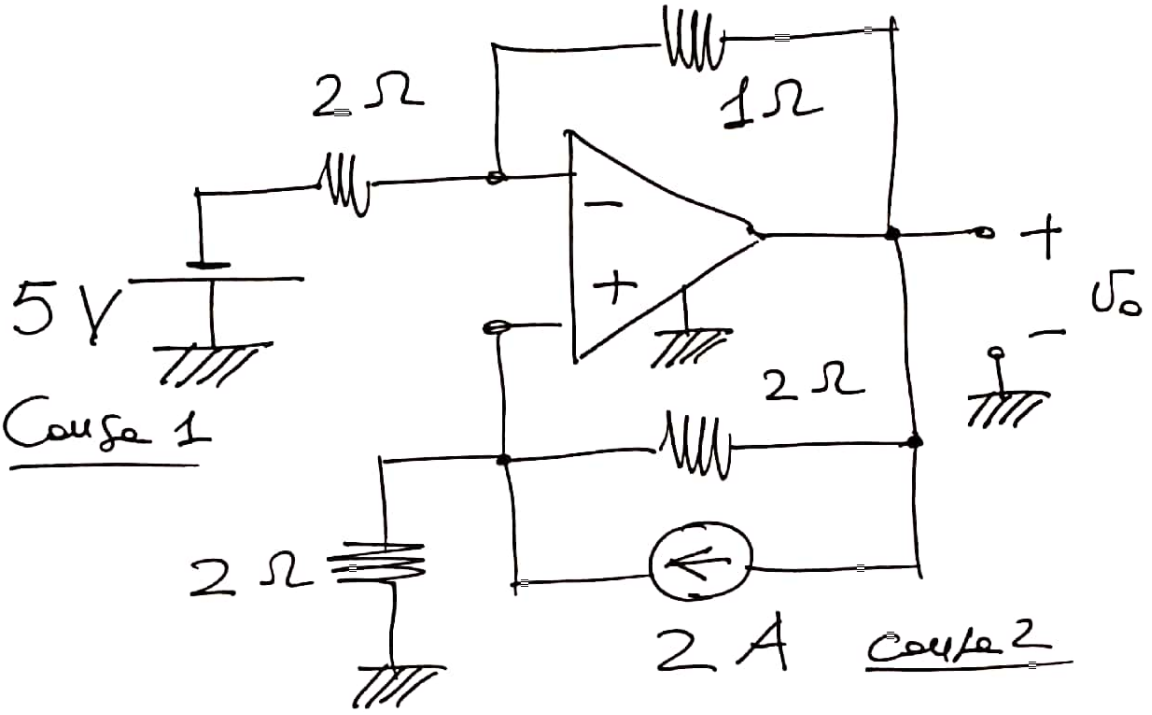
$$2v_B - 20 + 2v_B + v_B = 0 \Rightarrow$$

$$\boxed{v_B = 4\ V}$$

(C) $$\frac{10 - 0}{5\times10^3} + \frac{v_o - 0}{5\times10^3} + \frac{v_B - 0}{5\times10^3} + 0 = 0$$

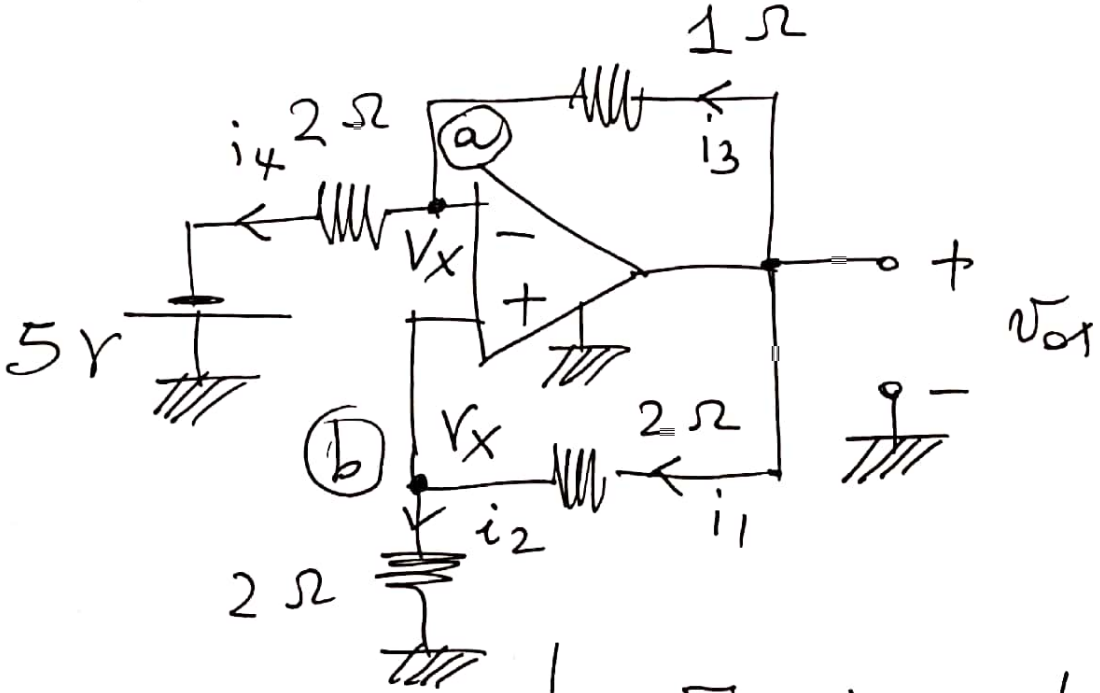
$$10 + v_o + 4 = 0 \qquad \boxed{v_o = -14\ V}.$$

Esempio Determinare v_o usando il p.s.e.



Causa 1 — Causa 2

$$v_o = v_{o1} + v_{o2}$$



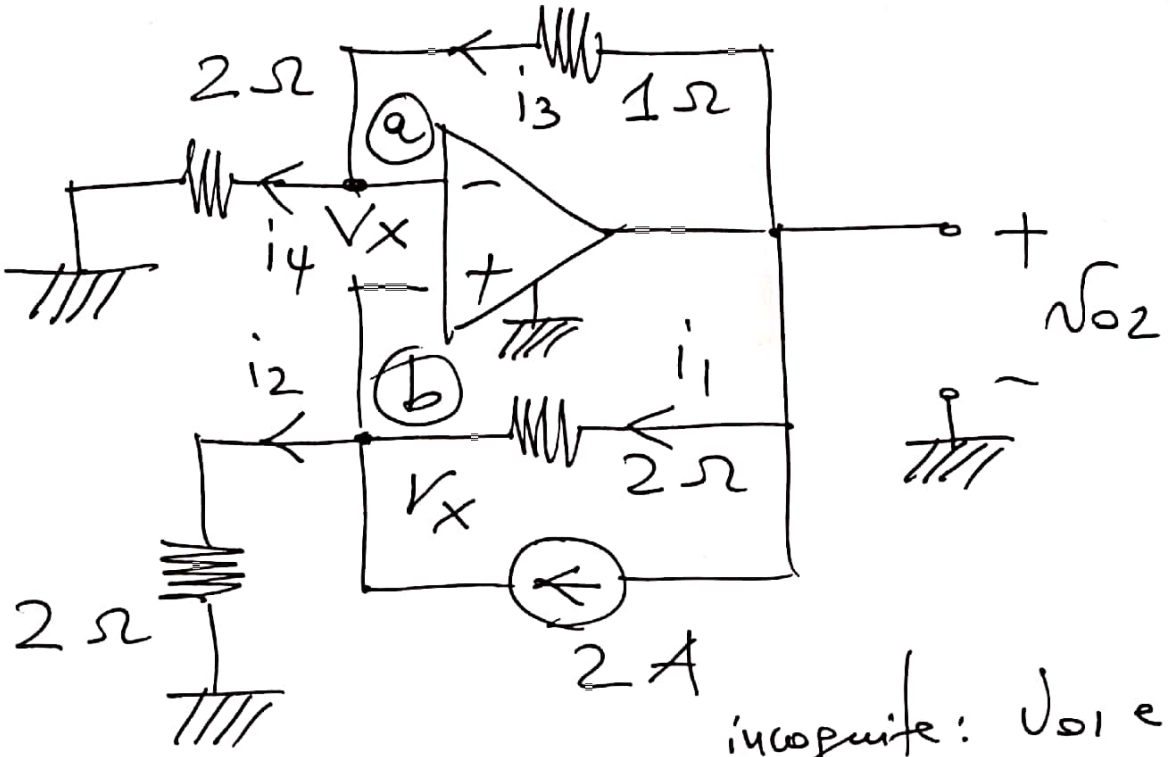
1 sola incognita V_x in effetti e V_{o1}

kI nodo, (b): $i'_1 = i'_2$, cioè

$$\frac{v_{o1} - V_x}{2} = \frac{V_x - 0}{2} \Rightarrow V_x = \frac{v_{o1}}{2}$$

kI nodo, (a): $i'_3 = i'_4$

$$v_{o1} - \frac{v_{o1}}{2} = \left[\frac{v_{o1}}{2} + 5\right]\frac{1}{2} \Rightarrow \boxed{v_{o1} = 10\ V}$$



incognite: V_{o1} e V_x

KI nodo (b): $i_1 + 2 = i_2$

$$2 + \frac{V_{o2} - V_x}{2} = \frac{V_x - 0}{2}$$

KI nodo (a): $i_3 = i_4$

$$\frac{V_{o2} - V_x}{1} = \frac{V_x - 0}{2}$$

risolvendo ottengo: $V_{o2} = 12\ V.$

Allora

$$V_o = V_{o1} + V_{o2} = 10 + 12 = 22\ V.$$