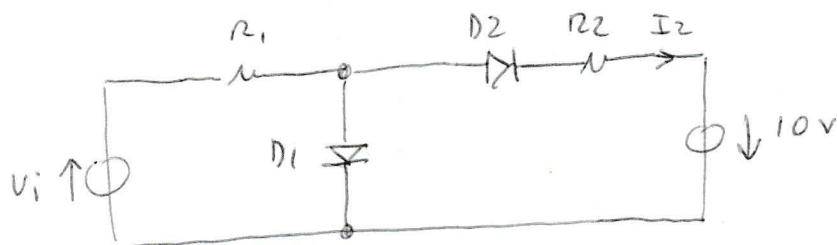


DETERMINARE LA CORRENTE I_2 AL VARIARE DI V_i'
E TRACCIARE LA CARATTERISTICA DI TRASFERIMENTO $I_2(V_i')$



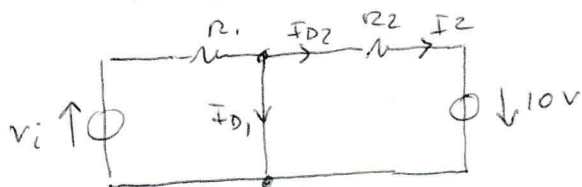
DIODI IDEALI

$$R_1 = 1\text{K}\Omega$$

$$R_2 = 5\text{K}\Omega$$

* 4p1 D_1 e D_2 in conduzione ($D_1 \text{ ON}, D_2 \text{ ON}$)

CIRC. EQUIV.



$$I_2 = \frac{10\text{V}}{R_2} = \frac{10\text{V}}{5\text{K}\Omega} = 2\text{mA}$$

$$I_{D1} = \frac{V_i' - 10\text{V}}{R_1} = \frac{V_i' - 10\text{V}}{1\text{K}\Omega} = \frac{V_i'}{1\text{K}\Omega} - 2\text{mA}$$

$$I_{D2} = I_2 = 2\text{mA}$$

- VERIFICA IPOTESI

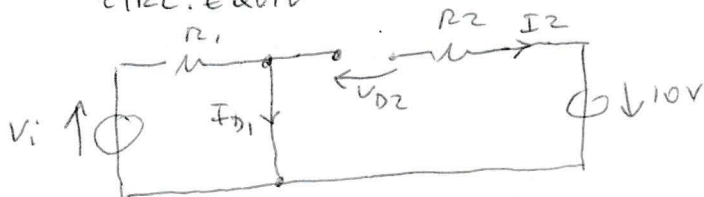
$$D_1 \text{ ON SE } I_{D1} > 0 \quad \left(\frac{V_i'}{1\text{K}\Omega} - 2\text{mA} > 0 \rightarrow V_i' > 1\text{K}\Omega \cdot 2\text{mA} \rightarrow V_i' > 2\text{V} \right)$$

$$D_2 \text{ ON SE } I_{D2} > 0 \quad (I_{D2} = 2\text{mA}) \text{ VERIFICATO}$$

(IPOTESI VERIFICATA per $V_i' > 2\text{V}$)

* 4p2 $D_1 \text{ ON}, D_2 \text{ OFF}$

CIRC. EQUIV.



$$I_2 = 0$$

$$I_{D1} = \frac{V_i'}{R_1} = \frac{V_i'}{1\text{K}\Omega}$$

$$V_{D2} = 10\text{V}$$

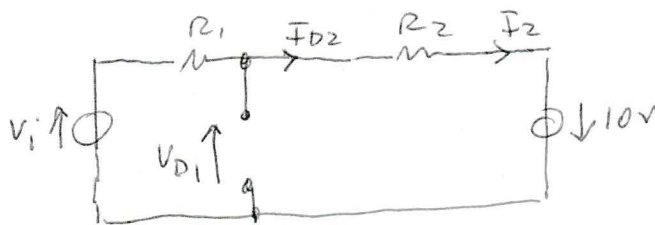
- VERIFICA IPOTESI

$$D_1 \text{ ON SE } I_{D1} > 0 \quad \left(\frac{V_i'}{1\text{K}\Omega} > 0 \rightarrow V_i' > 0 \right)$$

$$D_2 \text{ OFF SE } V_{D2} < 0 \quad (V_{D2} = 10\text{V}) \text{ NON VERIFICATO}$$

(IPOTESI NON VERIFICATA)

* Hp3 D1 OFF, D2 ON
CIRC. EQUIV.



$$I_2 = \frac{V_i + 10}{R_1 + R_2} = \frac{V_i + 10}{6 \text{ k}\Omega}$$

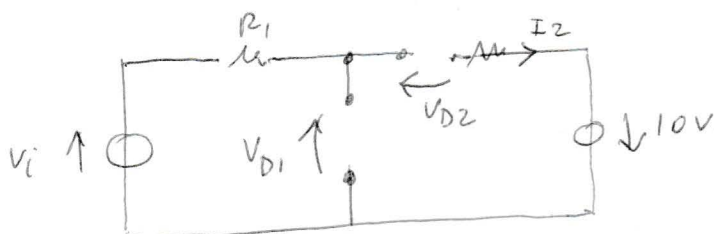
$$V_{D1} = V_i - R_1 I_2 = V_i - 1 \text{ k}\Omega \cdot \frac{V_i + 10}{6 \text{ k}\Omega} = V_i - \frac{V_i}{6} - \frac{10}{6} = \frac{5}{6} V_i - 1,67 \text{ V}$$

- VERIFICA IPOTESI

$$\left. \begin{aligned} \text{D1 OFF SE } V_{D1} < 0 \quad \left(\frac{5}{6} V_i - 1,67 \text{ V} < 0 \rightarrow 5 V_i < 10 \text{ V} \rightarrow V_i < 2 \text{ V} \right) \\ \text{D2 ON SE } I_{D2} > 0 \quad \frac{V_i + 10}{6 \text{ k}} > 0 \rightarrow V_i > -10 \text{ V} \end{aligned} \right\}$$

IPOTESI VERIFICATA PER $-10 \text{ V} < V_i < 2 \text{ V}$

* Hp4 D1 = OFF, D2 OFF
CIRC. EQUIV.



$$I_1 = 0$$

$$I_2 = 0$$

$$V_{D1} = V_i - R_1 I_1 = V_i$$

$$V_{D2} = 10 \text{ V} + V_{D1} = 10 \text{ V} + V_i$$

- VERIFICA IPOTESI

$$\left. \begin{aligned} \text{D1 OFF SE } V_{D1} < 0 \quad (V_i < 0) \\ \text{D2 OFF SE } V_{D2} < 0 \quad (10 \text{ V} + V_i < 0 \rightarrow V_i < -10 \text{ V}) \end{aligned} \right\}$$

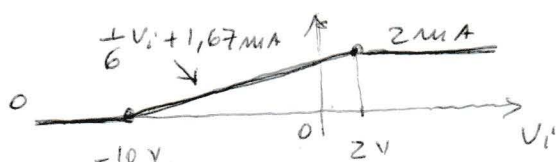
IPOTESI VERIFICATA PER $V_i < -10 \text{ V}$

LO STATO DI FUNZIONAMENTO DELLA COPPIA DI DIODI È IL SEGUENTE :

a) per $V_i < -10 \text{ V}$ $I_2 = 0$ (Hp4)

b) per $-10 \text{ V} < V_i < 2 \text{ V}$ $I_2 = \frac{V_i}{6 \text{ k}} + 1,67 \text{ mA}$ (Hp3)

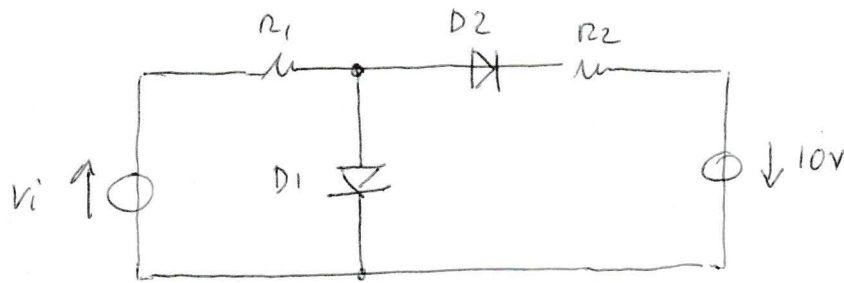
c) per $V_i > 2 \text{ V}$ $I_2 = 2 \text{ mA}$ (Hp1)



ES. DA SVOLGERE -

DETERMINARE LA CORRENTE I_2 AL VARIARE DI V_i

E TRACCIARE LA CARATTERISTICA DI TRASFERIMENTO $I_2(V_i)$



DIODI IDEALI

$R_1 = 10\text{ K}\Omega$

$R_2 = 5\text{ K}\Omega$