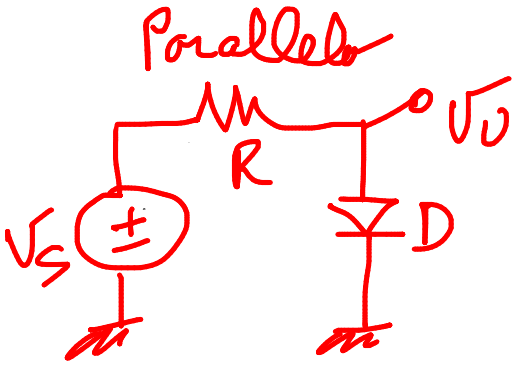
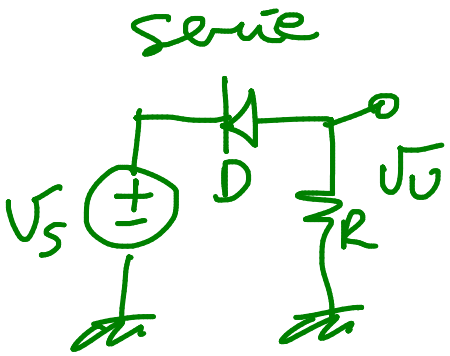


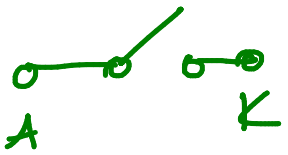


D : ON $\Rightarrow$

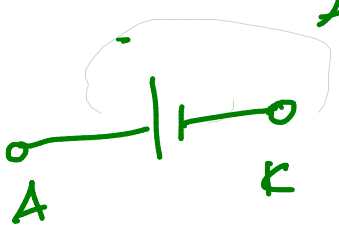
$\Leftrightarrow V_{AK} > V_{\gamma}$

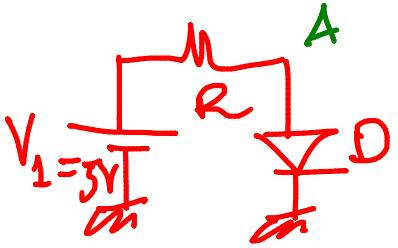
$I_D > 0$

OFF $\Rightarrow$

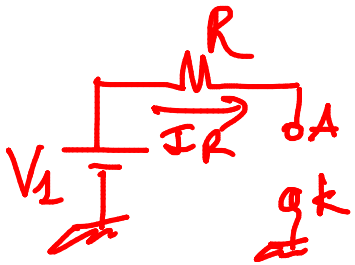


$V_{AK} < V_{\gamma}$





D : OFF:



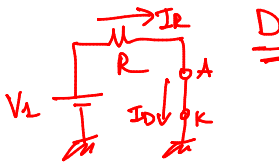
$V_{AK} < 0V$

$V_A = V_1 - R I_R$; $I_R = 0$

$V_K = 0V$

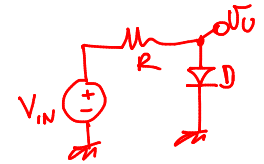
$V_A = V_1$

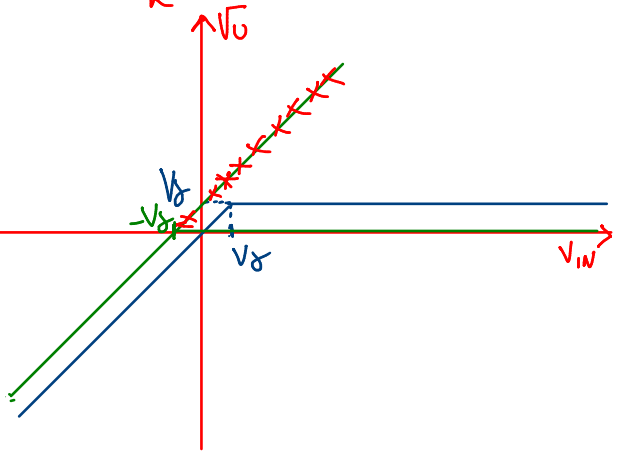
$V_{AK} = V_A - V_K = V_1 = 5$



D è ON

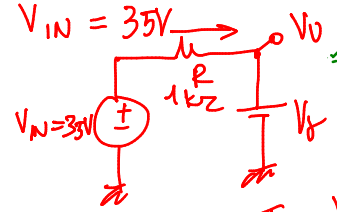
$I_D = I_R = \frac{V_1}{R} > 0$ ipo è ok





$V_{IN} \gg 1$

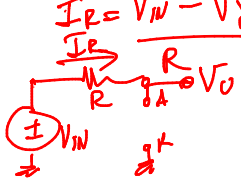
$V_{IN} = 35V$



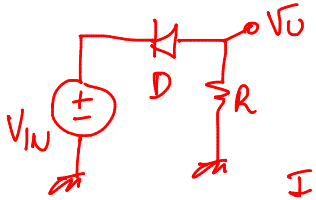
$I_R > 0 \Rightarrow V_U = V_\gamma \quad V_{IN} > V_\gamma \Rightarrow$ D: ON

$I_R = \frac{V_{IN} - V_\gamma}{R}$

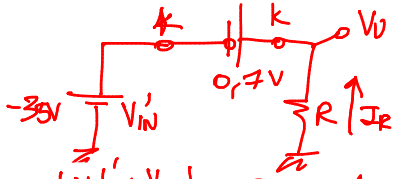
$V_{IN} < V_\gamma \Rightarrow$



$V_U = V_{IN} - RI_R = V_{IN}$



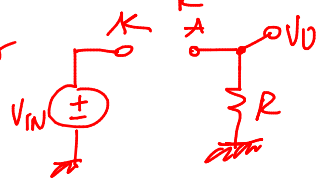
$\Leftarrow I_D$



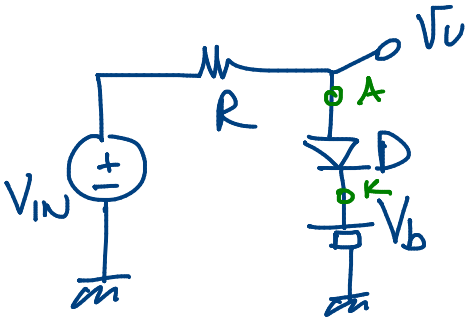
$V_U = V_{IN} + V_\gamma$

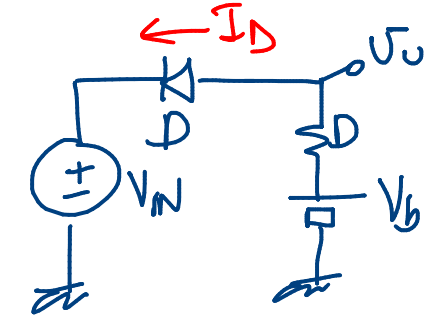
$I_D = \frac{|V'_{IN} + V_\gamma|}{R} = 35{,}7mA$

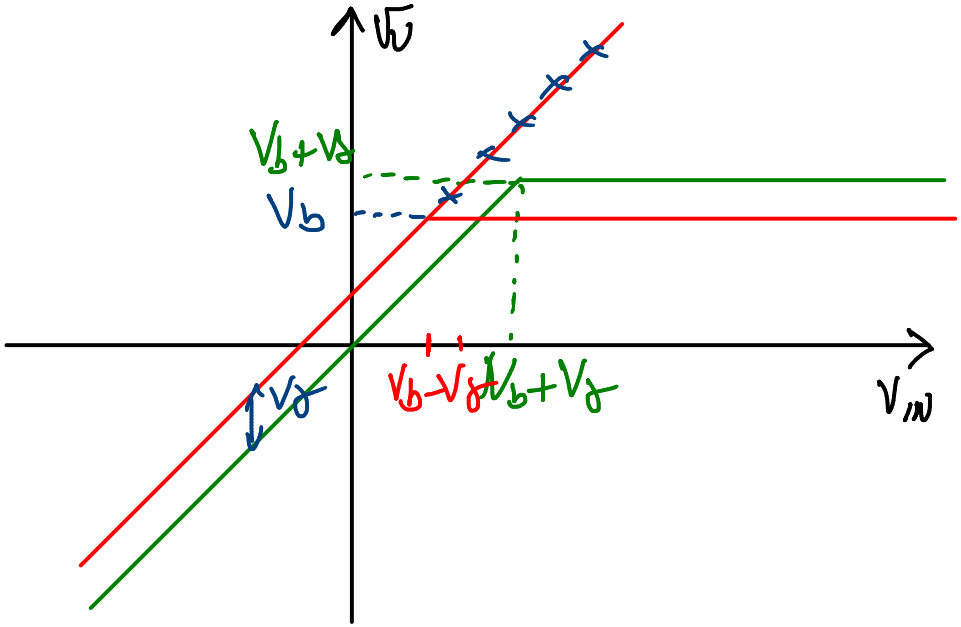
$V_{IN} > V_\gamma$



$V_U = ?$





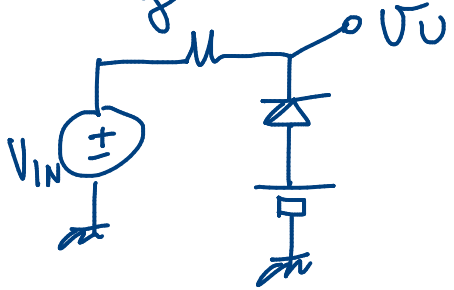


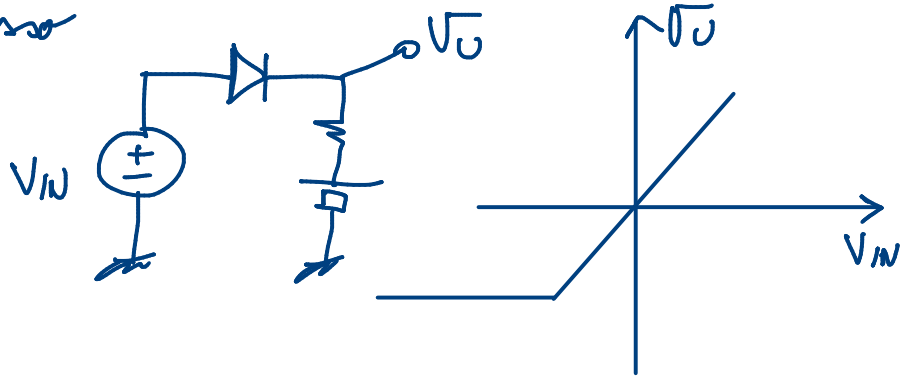
$V_U = V_{IN} + V_\gamma$

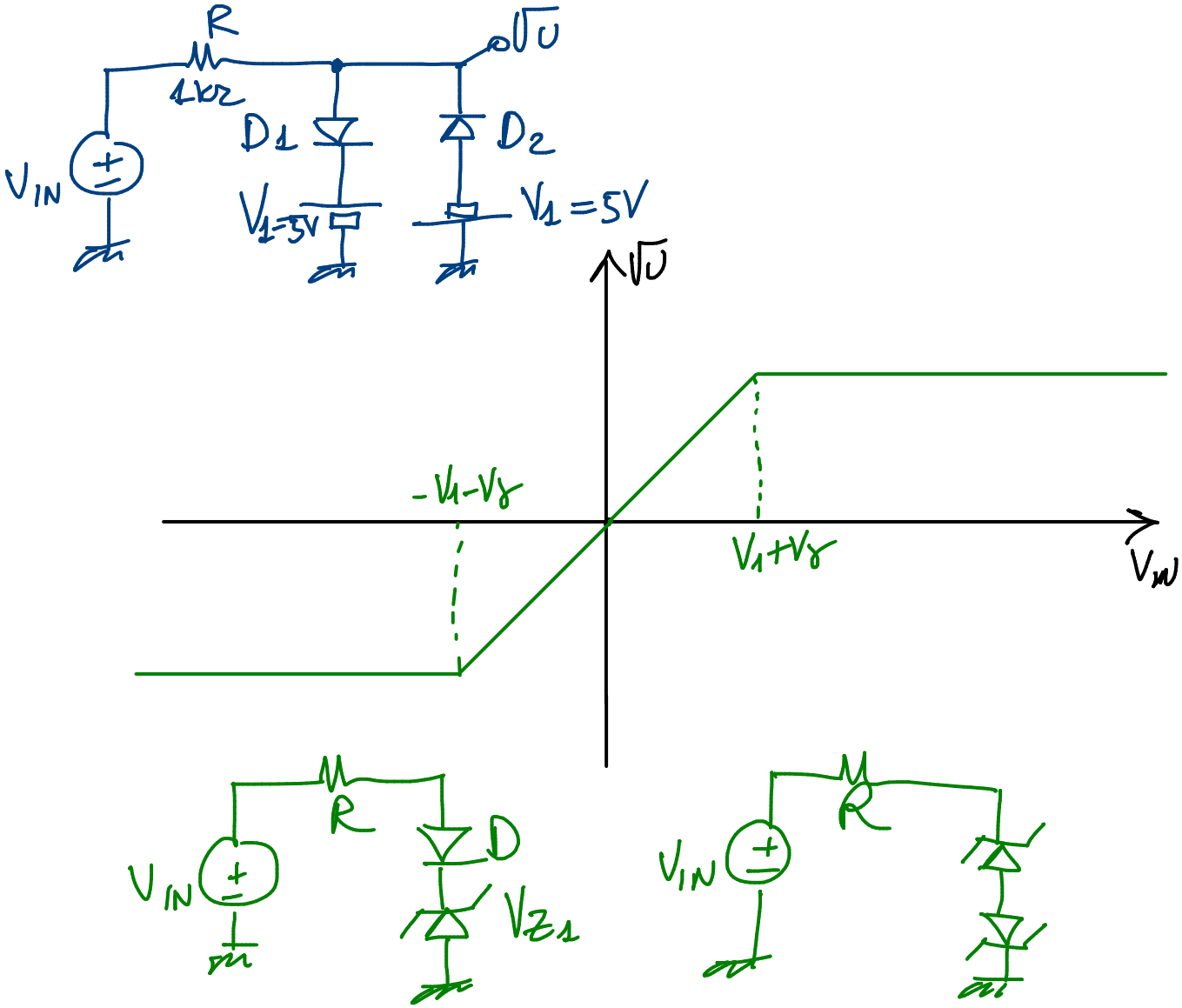
$I_D = \dfrac{V_b - V_\gamma - V_{IN}}{R} > 0$

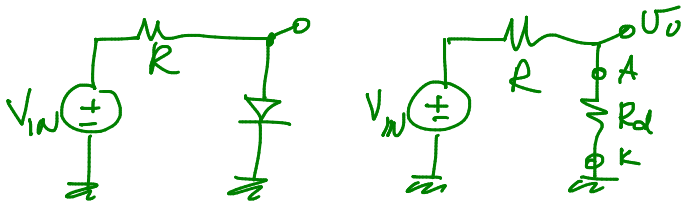
$V_{IN} = V_b - V_\gamma$

Tagliatori in basso

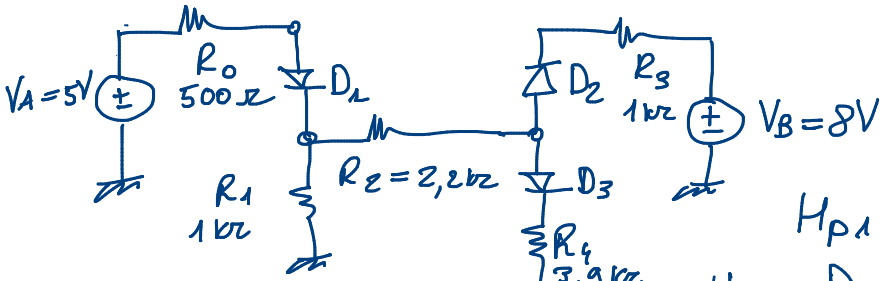





R
1kΩ
V_{IN}
D_1
D_2
V_1=5V
V_1=5V
√U
$-V_1-V_\gamma$
V_1+V_γ
V_{IN}
R
D
V_{IN}
V_{Z1}
R
V_{IN}



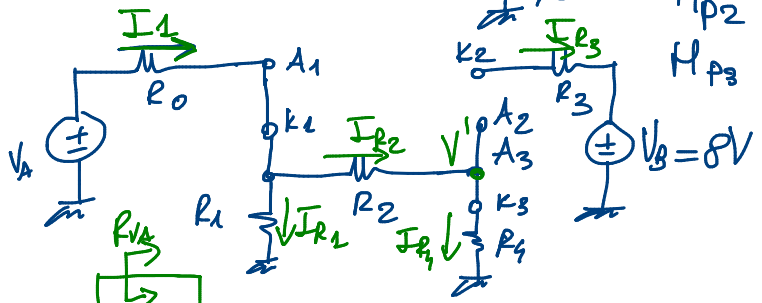
$V_O \neq 0 \qquad V_O = \dfrac{R_d}{R+R_d} V_{IN}$

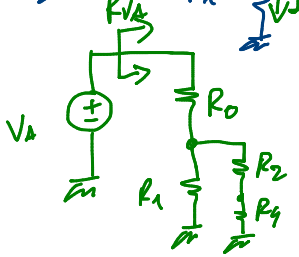


H_{P1} : D_2 OFF

H_{P2} : D_1 ON

H_{P3} : D_3 ON





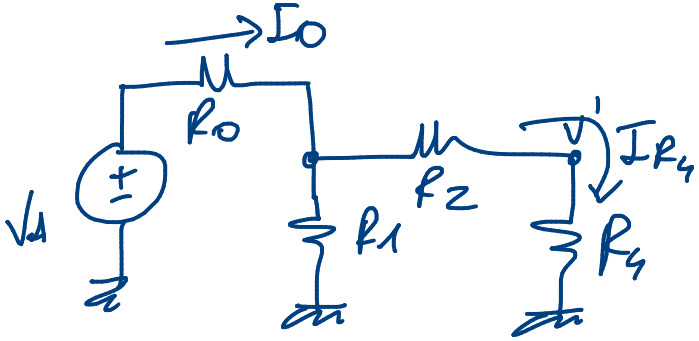
$R_{VA} = R_0 + R_1 // (R_2 + R_4)$

$R_p = R_1 // R_2 = \dfrac{R_1 R_2}{R_1 + R_2}$

$R_1 // R_2 // R_3 = (R_1 // R_2) // R_3 = R_1 // (R_2 // R_3)$

$$I_1 = \frac{V_A}{R_{VA}} = \frac{V_A}{R_0 + R_1 // (R_2 + R_4)} = 3{,}68\,mA$$

Verifica Hp2



$I_{R_4} = ?$

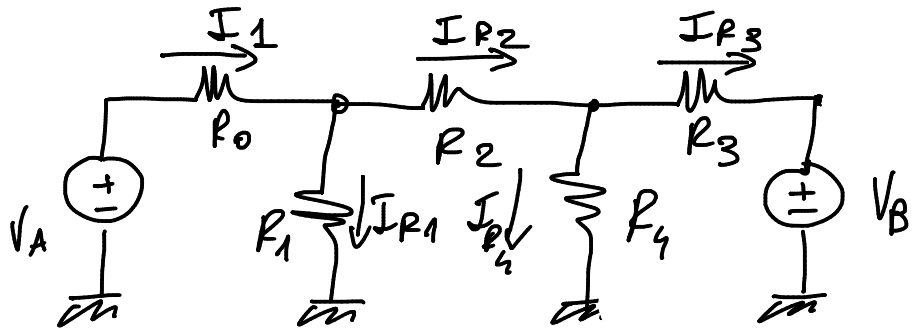
$$I_{R_4} = I_0 \frac{R_1}{R_1 + R_2 + R_4} = 0{,}518\,mA$$

Verifica Hp3

$$V' = R_4 I_{R_4} = 2{,}02\,V = V_{A2}$$

$$V_{K2} = V_B = 8\,V \qquad V_{AK2} = V_{A2} - V_{K2} = -5{,}98\,V$$

Verifica Hp2



H_p: $D_1 \wedge D_2 \wedge D_3$ ON

Dispositivo B

$$I_1^{(A)} = \frac{V_A}{R_{VA}} \; ; \quad \boxed{R_{VA} = R_0 + R_1 // \left[R_2 + R_3 // R_4 \right] = 1{,}25\,k\Omega}$$

$$I_1^{(A)} \cong 4\,mA \; ; \quad I_{R_2}^{(A)} = \frac{I_1^{(A)} R_1}{R_1 + R_2 + R_3 // R_4} \cong 1\,mA$$

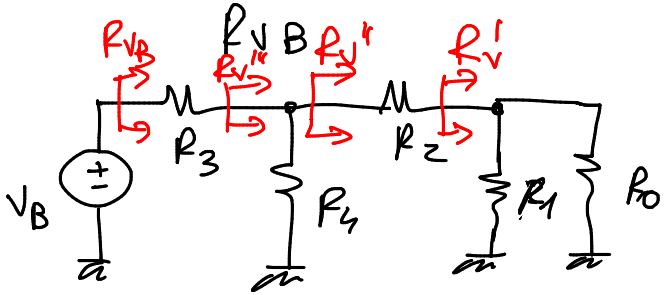
$$I_{R_3}^{(A)} = \frac{I_{R_2}^{(A)} R_4}{R_4 + R_3} = 0{,}797\,mA$$

$$I_{R_4}^{(A)} = I_{R_2}^{(A)} \frac{R_3}{R_3 + R_4} = 0{,}203\,mA$$

Disattivo A

$R_{VB} = ?$

$$I_{R_3}^{(B)} = -\frac{V_B}{\quad}$$



$R_V' = R_1 \parallel R_0$

$R_V'' = R_2 + R_V'$

$R_V''' = R_4 \parallel R_V''$

$R_{VB} = R_3 + R_V'''$

$$R_{VB} = R_3 + R_4 \parallel \left[R_2 + R_1 \parallel R_0 \right] = 2{,}54\ k\Omega$$

$$I_{R_3}^{(B)} \simeq -3{,}15\ mA$$

$$I_{R_2}^{(B)} = I_{R_3}^{(B)} \frac{R_4}{R_4 + R_2 + R_1 \parallel R_0} \simeq -1{,}913\ mA$$

$$I_{R_4}^{(B)} = I_{R_2}^{(B)} - I_{R_3}^{(B)} = 1{,}2423\ mA$$

$$I_1^{(B)} = I_{R_2}^{(B)} \frac{R_1}{R_1 + R_0} = -1{,}27503\ mA$$

$$I_1 = I_{D1} = I_1^{(A)} + I_1^{(B)} = 2{,}7258\ mA \quad \underline{D_1 \text{ è ON}}$$

$$I_{D2} = I_{R_3} = I_{R_3}^{(A)} + I_{R_3}^{(B)} = -2{,}3580\ mA \quad \underline{D_2 \text{ è OFF}}$$

$$I_{D3} = I_{R_4} = I_{R_4}^{(A)} + I_{R_4}^{(B)} = 1{,}4466\ mA \quad \underline{D_3 \text{ è ON}}$$