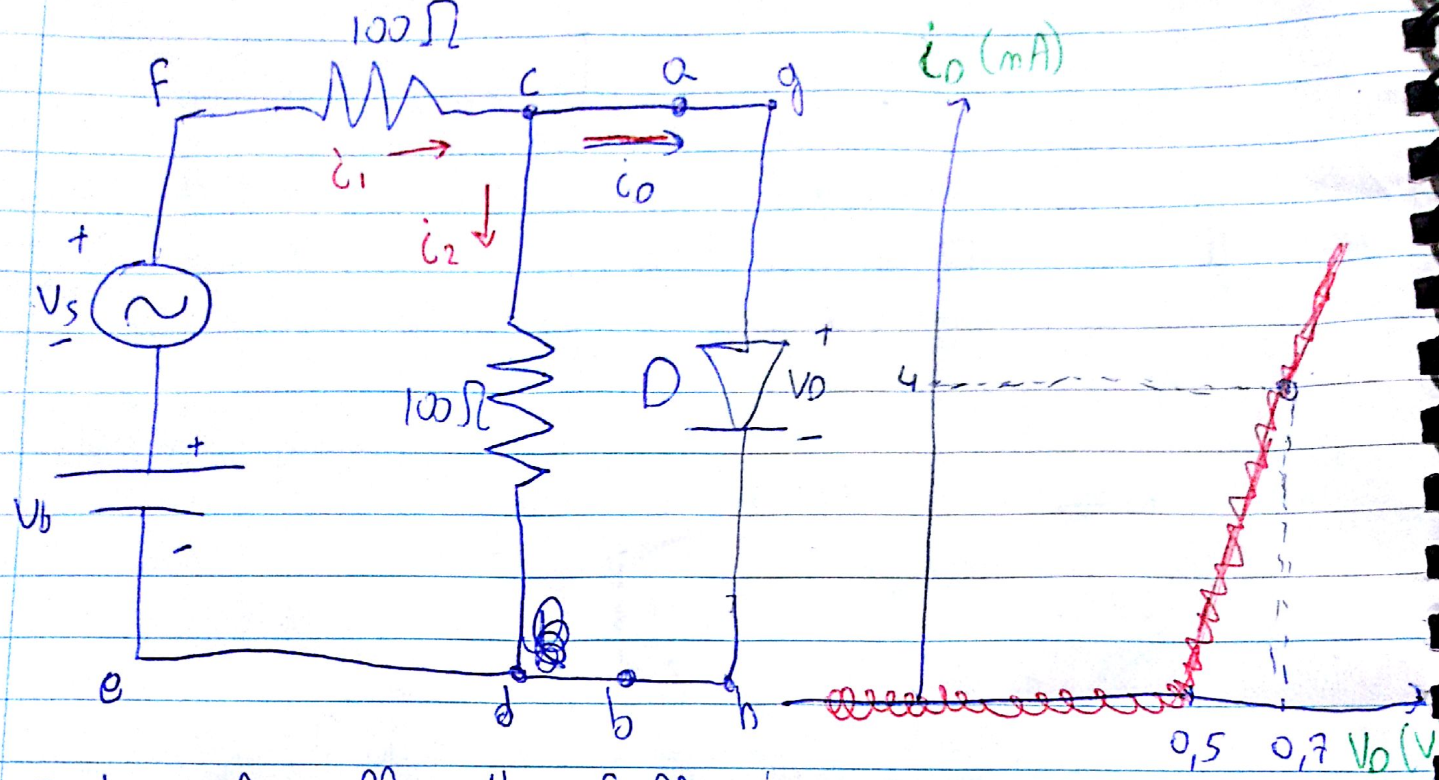


Find analytically the following i_d, v_d if $V_s = 0{,}1\cos wt$ V and $V_b = 2$V. Also find i_d using the graph.

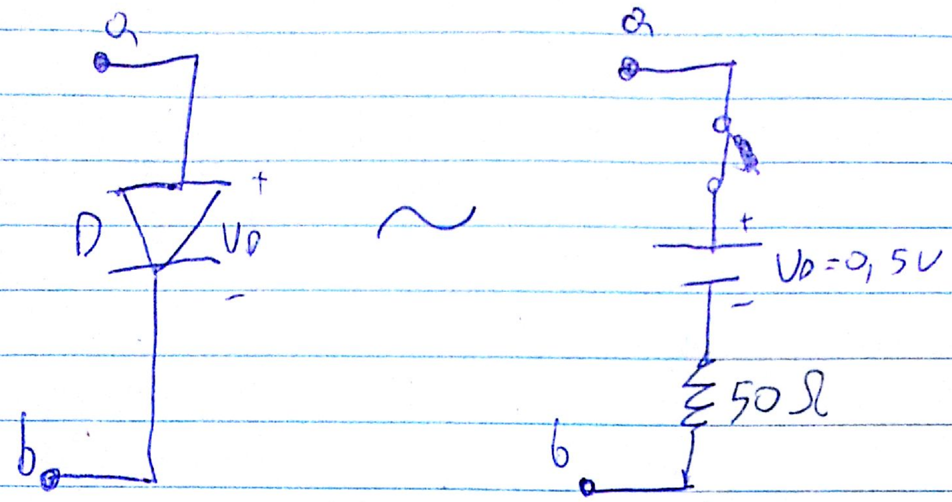
My approach

From the graph I notice that $i_d = 0$ for $V_d \leq 0{,}5$. So I understand that the diode has barrier potential which equals to 0,5 V. So when the sources voltage > 0,5, then current ~~starts~~ starts to flow through the diode.

From $V_d = 0{,}5$V and then, there is a linear relation. So I find the resistance: $\frac{dv}{di} = R$

$$\Rightarrow \frac{(0{,}7-0{,}5)\,V}{(4-0)\cdot 10^{-3}A} \Rightarrow R = 50\,\Omega$$

So $\boxed{v_d = 50 i_d}$. Therefore I need to find either v_d or i_d.



In the node c we have: $i_1 = i_2 + i_D$ ①

(cghd): $V_{100\Omega} = V_D$ or

$100 i_2 = 50 i_D \Rightarrow i_D = 2 i_2$ ②

①, ② : $i_1 = i_2 + 2i_2 = 3i_2 \Rightarrow i_1 = 3i_2 = \frac{3i_D}{2}$ ③

(cdef): $V_s + V_b = 100 i_1 + 100 i_2 \Rightarrow$

$0{,}1\cos\omega t + 2 = 100(4i_2) \Rightarrow 0{,}1\cos\omega t = 400 i_2 - 2$

$\Rightarrow i_2 = \ldots$

Then i find i_D and then

from the relation $V_d = 50 i_D$, I find V_d ???

(I don't know how to react with a combination of both a dc and a AC voltage source) Also this approach so far, beats me if it is rights.