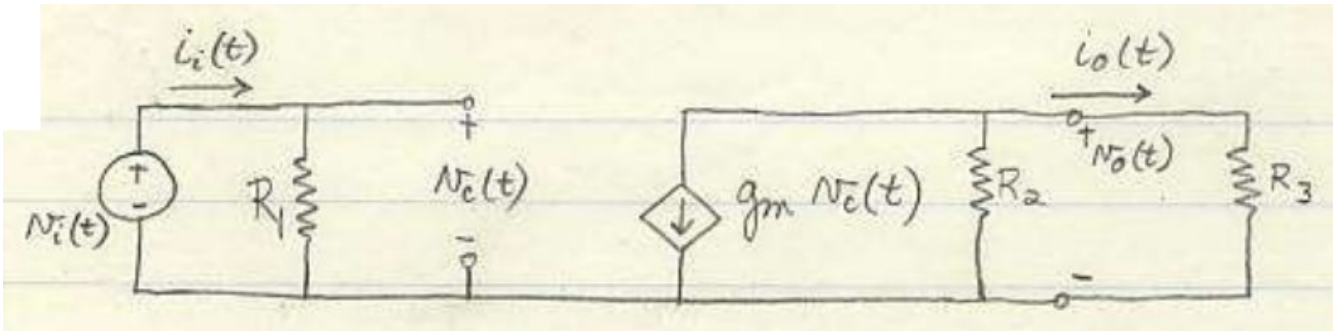
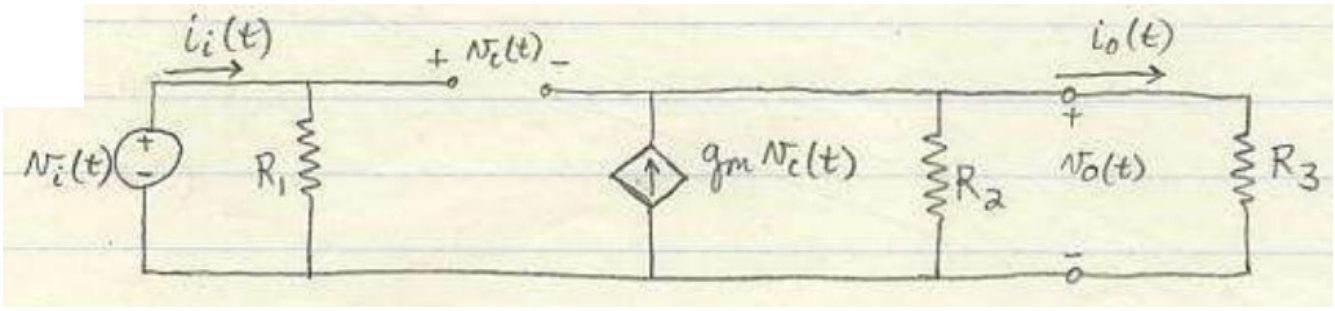
Problèmes

Exprimez $v_o(t)$ en fonction de $v_i(t)$, R_1, R_2, ... et g_m.

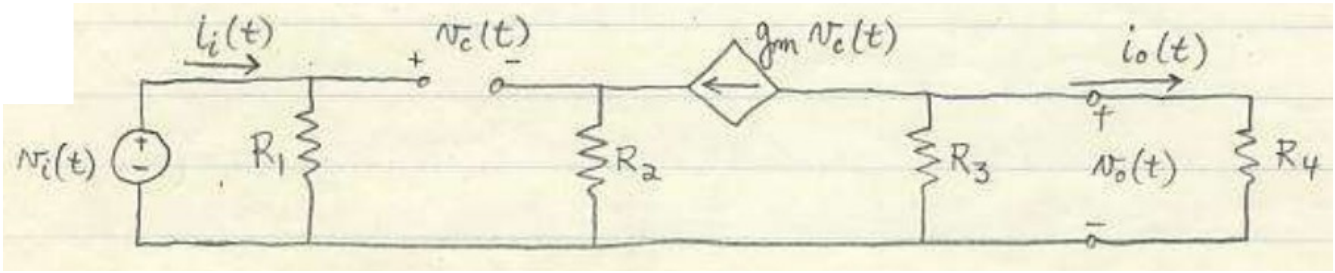
No 1



No 2

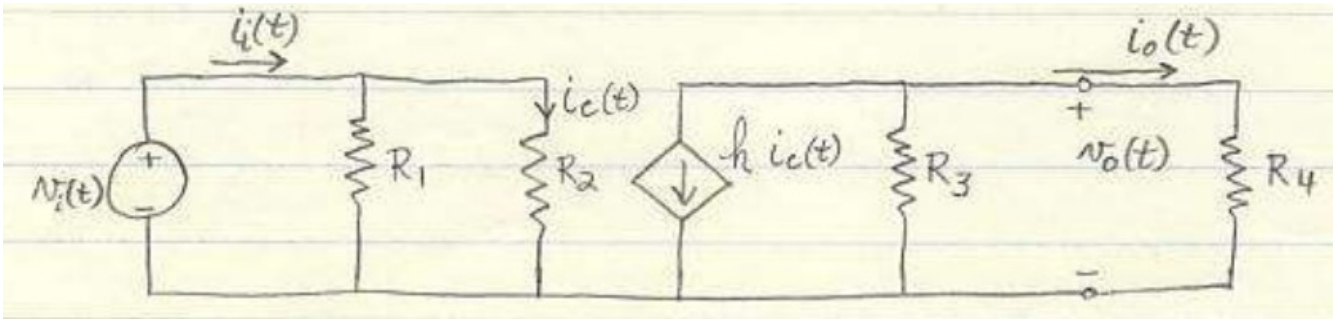


No 3

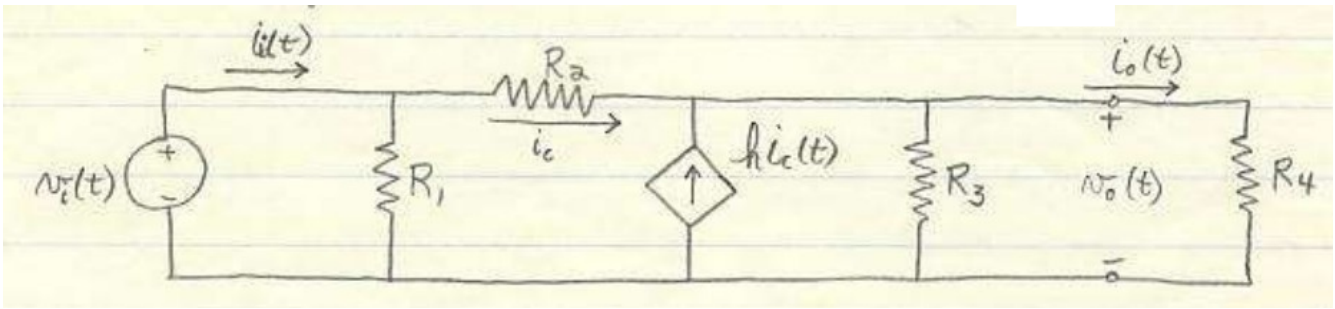


Exprimez $v_o(t)$ en fonction de $v_i(t)$, R_1, R_2, ... et h.

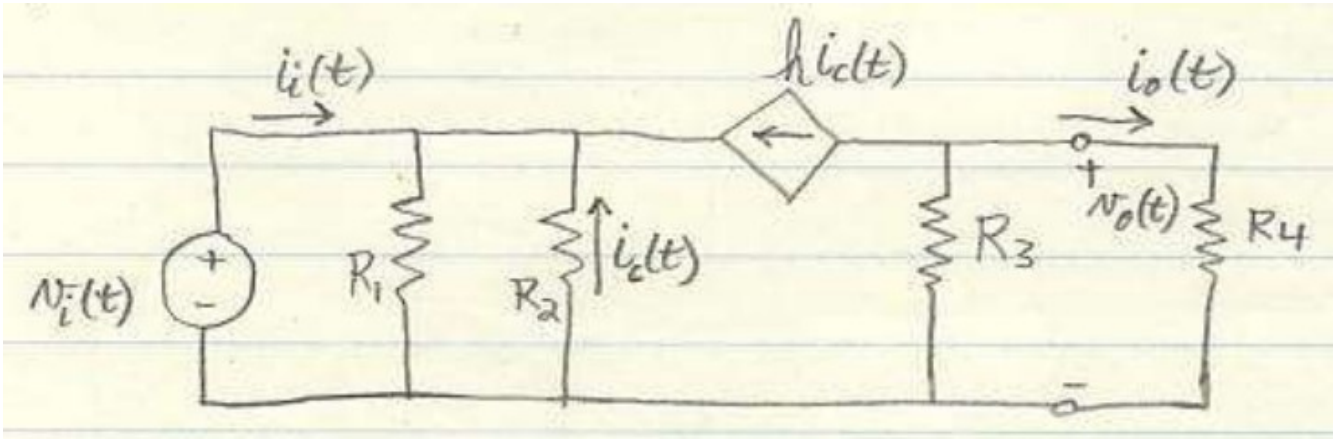
No 4



No 5



No 6



Solutions

No 1

Loi d'Ohm $\Rightarrow v_o = -g_m v_c(t)(R_2 \| R_3)$

Il est évident que $v_c(t) = v_i(t)$. Donc

$$v_o(t) = -g_m v_i(t)(R_2 \| R_3)$$

No 2

Loi d'Ohm $\Rightarrow v_o(t) = g_m v_c(t)(R_2 \| R_3)$

Il est clair que $v_c(t) = v_i(t) - v_o(t)$. Donc

$$v_o(t) = g_m(R_2 \| R_3)[v_i(t) - v_o(t)]$$

$$\Rightarrow v_o(t) = \frac{g_m(R_2 \| R_3)}{1 + g_m(R_2 \| R_3)} v_i(t)$$

No 3

Loi d'Ohm $\Rightarrow v_o(t) = -g_m v_c(t) (R_3 \| R_4)$. Mais on a aussi $v_c(t) = v_i(t) - R_2 g_m v_c(t)$

$$\Rightarrow v_c(t) = \frac{v_i(t)}{1 + R_2 g_m}$$

No 4

Loi d'Ohm $\Rightarrow v_o(t) = -h i_c(t) (R_3 \| R_4)$. Mais $i_c(t) = v_i(t)/R_2$ d'après la loi d'Ohm. On a donc:

$$v_o(t) = -\frac{h(R_3 \| R_4)}{R_2} v_i(t)$$

No 5

Loi d'Ohm $\Rightarrow$ $v_o(t) = (h+1)\, i_c(t)\, (R_3 \| R_4)$.

$$i_c(t) = \frac{v_i(t) - v_o(t)}{R_2}$$

Il s'ensuit que

$$v_o(t) = \frac{(h+1)(R_3 \| R_4)}{R_2} \left[v_i(t) - v_o(t) \right]$$

$$\Rightarrow v_o(t) = \frac{(h+1)(R_3 \| R_4)}{R_2 + (h+1)(R_3 \| R_4)}\, v_i(t).$$

No 6

Loi d'Ohm $\Rightarrow$ $v_o(t) = -h\, i_c(t)\, (R_3 \| R_4)$.

$$i_c(t) = -v_i(t)/R_2$$

Il s'ensuit que $v_o(t) = h \dfrac{(R_3 \| R_4)}{R_2}\, v_i(t)$.