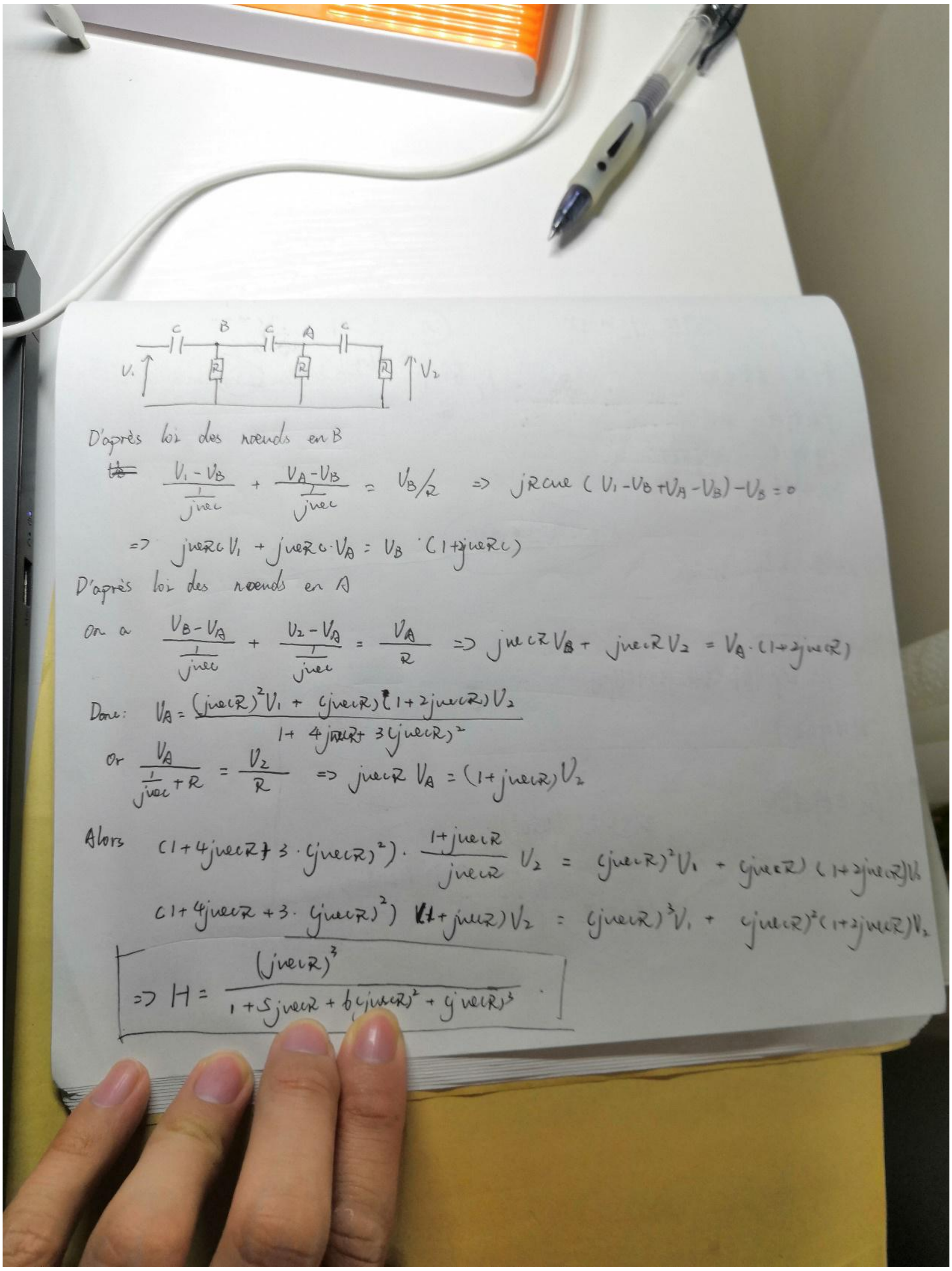
1.



D'après loi des nœuds en B

$$\frac{V_1 - V_B}{\frac{1}{j\omega C}} + \frac{V_A - V_B}{\frac{1}{j\omega C}} = V_B/R \Rightarrow jRC\omega\,(V_1 - V_B + V_A - V_B) - V_B = 0$$

$$\Rightarrow j\omega RC\,V_1 + j\omega RC \cdot V_A = V_B \cdot (1 + 2j\omega RC)$$

D'après loi des nœuds en A

On a $$\frac{V_B - V_A}{\frac{1}{j\omega C}} + \frac{V_2 - V_A}{\frac{1}{j\omega C}} = \frac{V_A}{R} \Rightarrow j\omega CR\,V_B + j\omega CR\,V_2 = V_A \cdot (1 + 2j\omega CR)$$

Donc: $$V_A = \frac{(j\omega CR)^2 V_1 + (j\omega CR)(1 + 2j\omega CR) V_2}{1 + 4j\omega CR + 3(j\omega CR)^2}$$

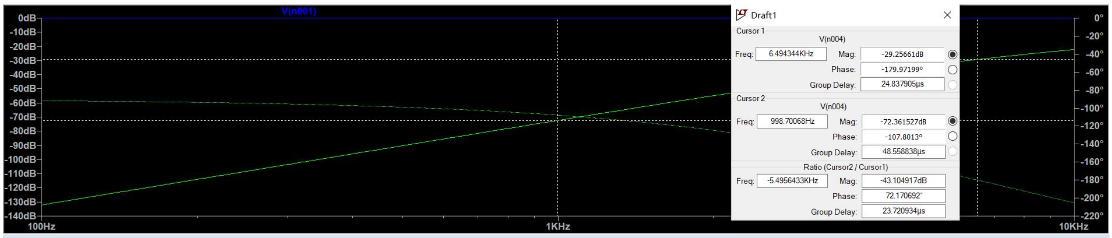
Or $$\frac{V_A}{\frac{1}{j\omega C} + R} = \frac{V_2}{R} \Rightarrow j\omega CR\,V_A = (1 + j\omega CR) V_2$$

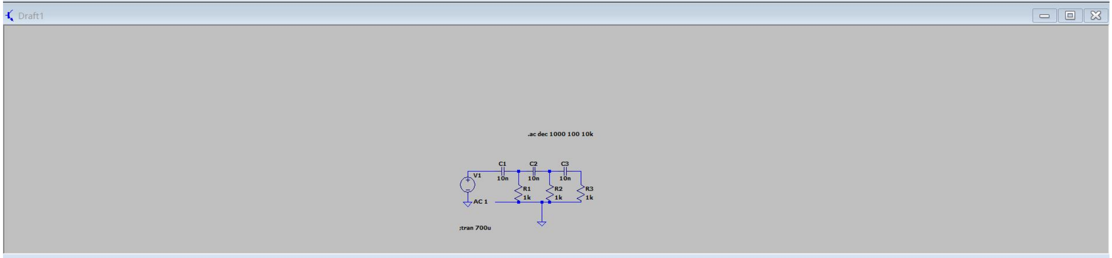
Alors $$(1 + 4j\omega CR + 3 \cdot (j\omega CR)^2) \cdot \frac{1 + j\omega CR}{j\omega CR} V_2 = (j\omega CR)^2 V_1 + (j\omega CR)(1 + 2j\omega CR) V_2$$

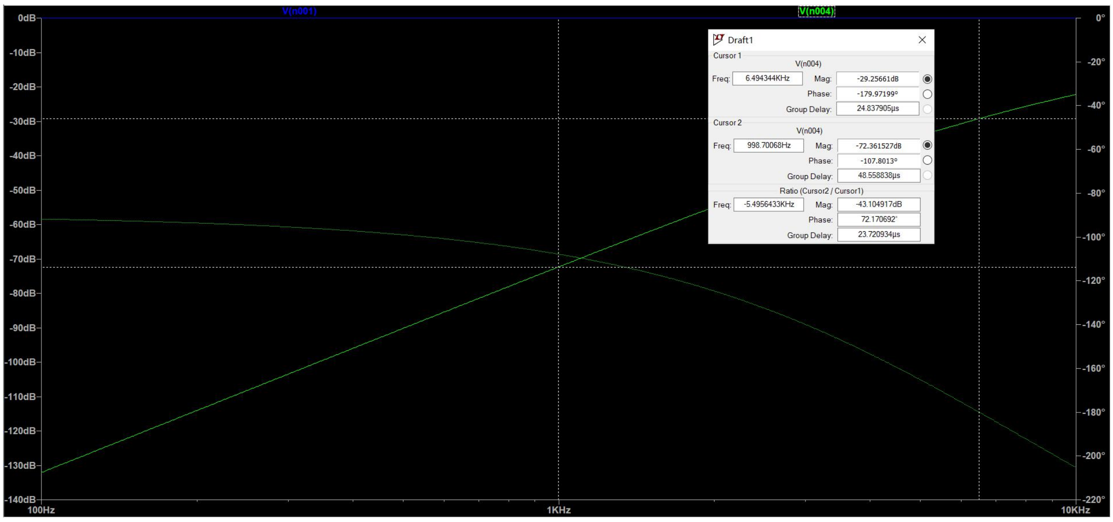
$$(1 + 4j\omega CR + 3 \cdot (j\omega CR)^2)(1 + j\omega CR) V_2 = (j\omega CR)^3 V_1 + (j\omega CR)^2 (1 + 2j\omega CR) V_2$$

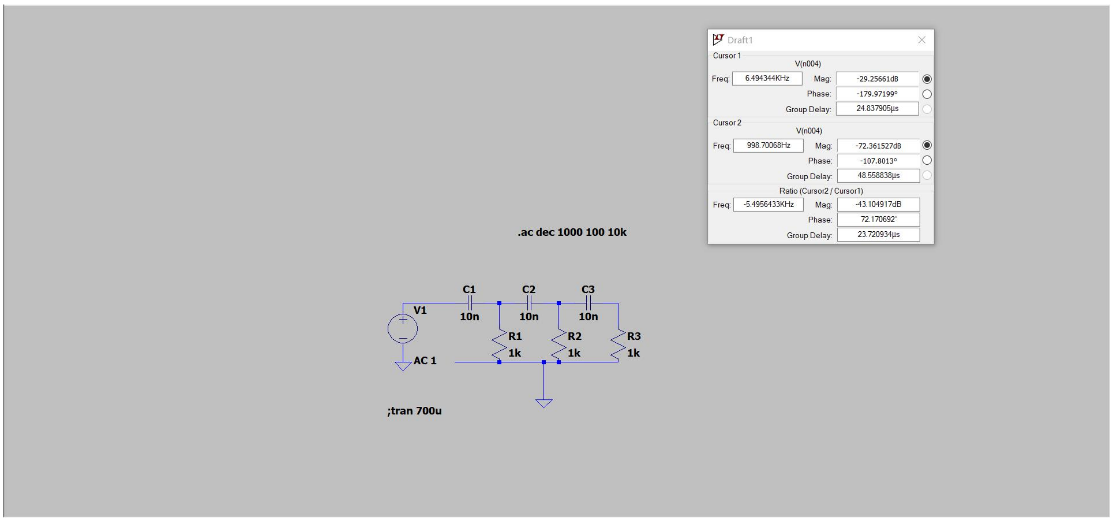
$$\boxed{\Rightarrow H = \frac{(j\omega CR)^3}{1 + 5j\omega CR + 6(j\omega CR)^2 + (j\omega CR)^3}}$$

2.





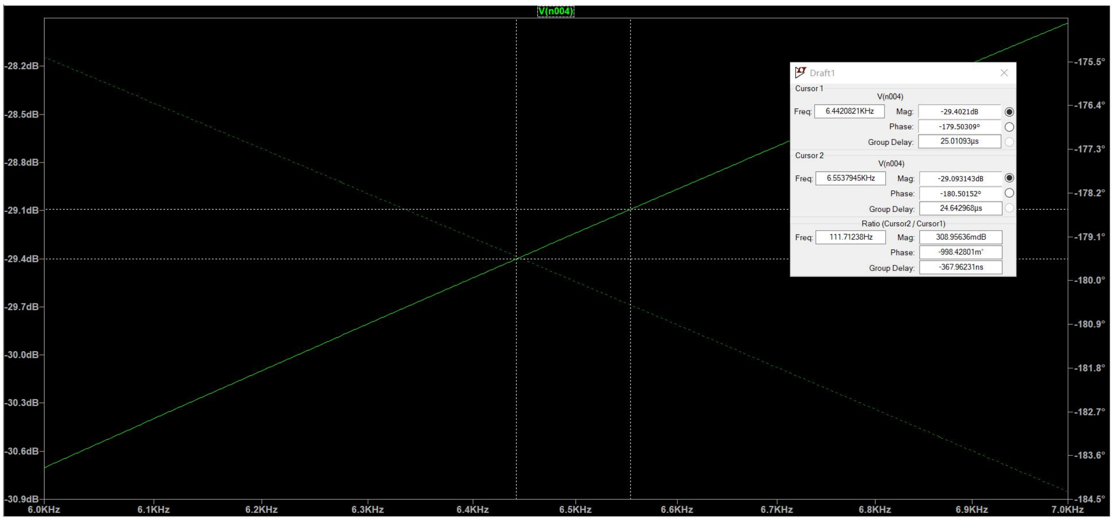




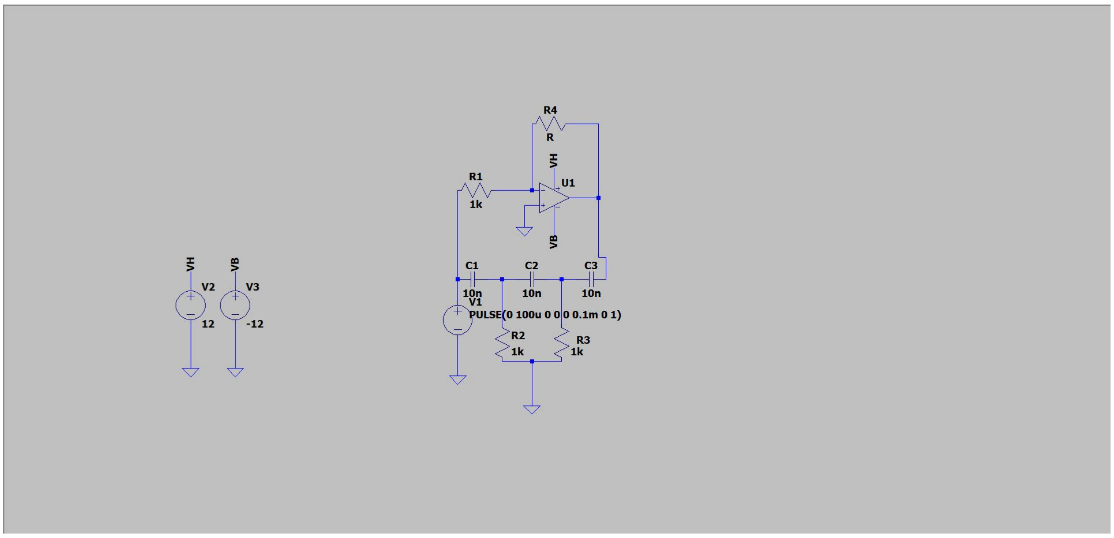
3.Donc on a F_0= 6.5kHz et A_0 est environs 29.

4.On sait que $S(\omega 0) = |\frac{d\varphi\beta(j\omega)}{d(\omega/\omega_0)}|_{\omega=\omega_0}$ Donc ici on a

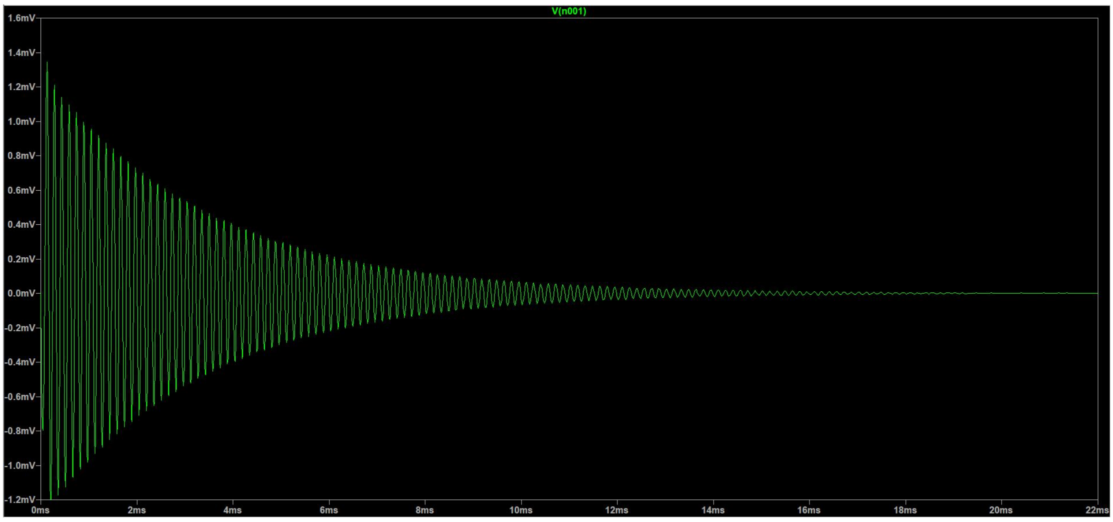
$S(\omega_0) = \left|\frac{[-180.5-(-179.5)]\times\pi}{(6.55k-6.44k)\times 180}\right| \times F0$=1.03 cet valeur est proche de valeur 1.01 qui est dans le cour.



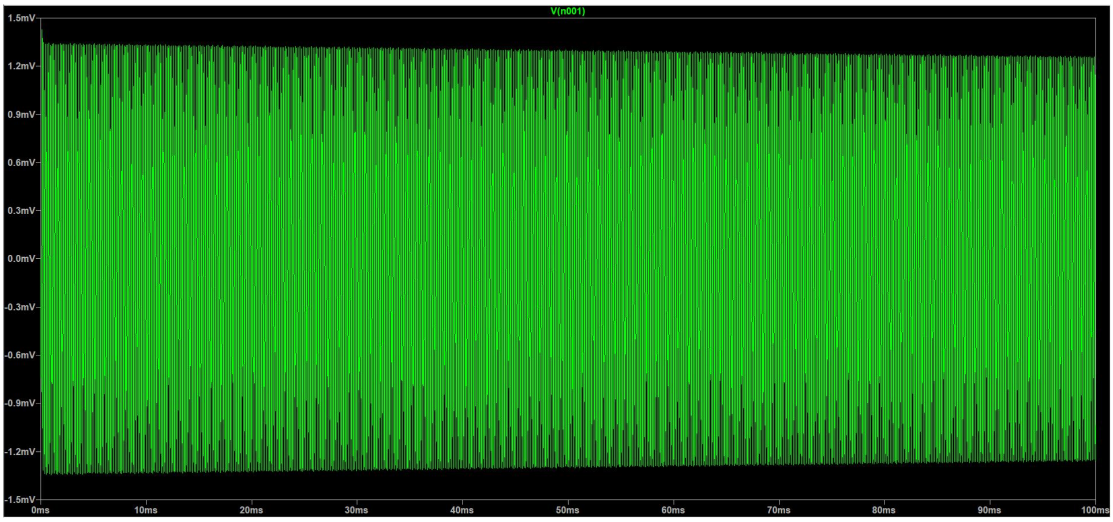
5.Le circuit est :

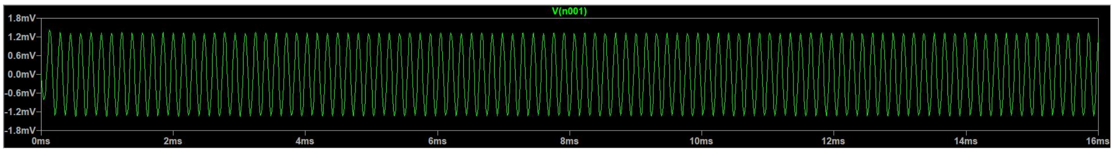


6.Quand $|A\beta(j\omega)| < 1$ on donne $R_2/R_1 < 29$ R_2<29kΩ R_2=28kΩ

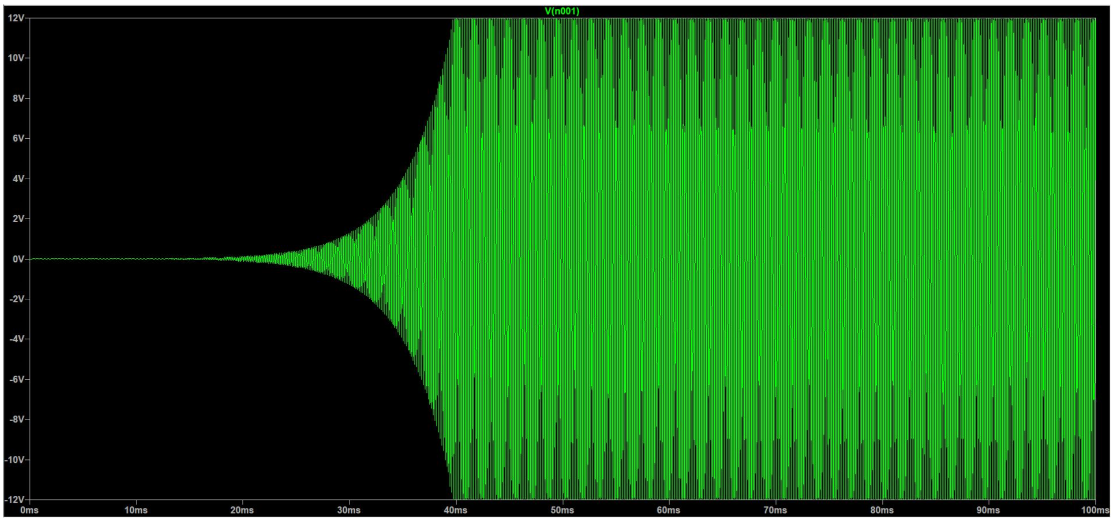


Quand $|A\beta(j\omega)| = 1$ on donne $R_2/R_1 = 29.09$ R_2=29.09kΩ

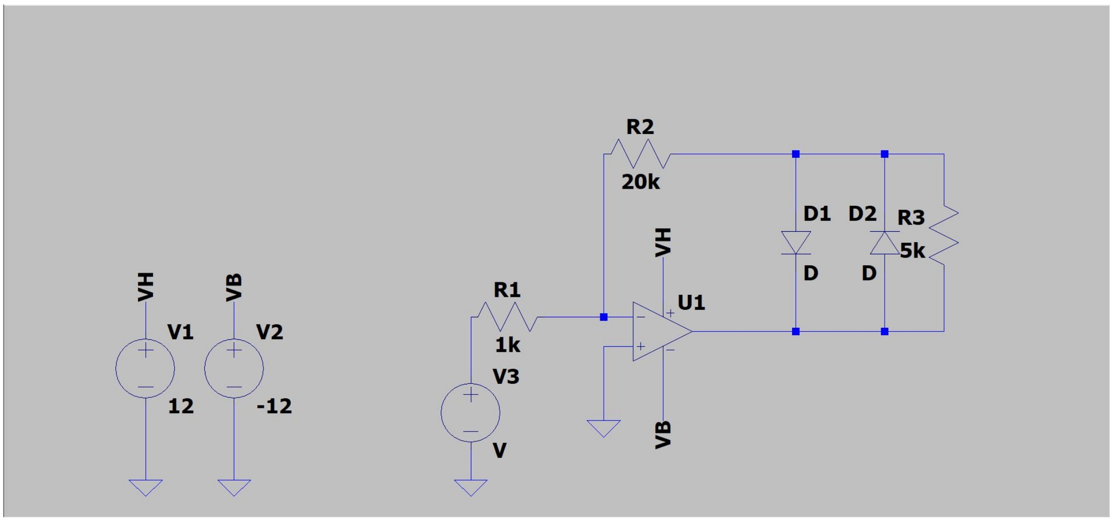




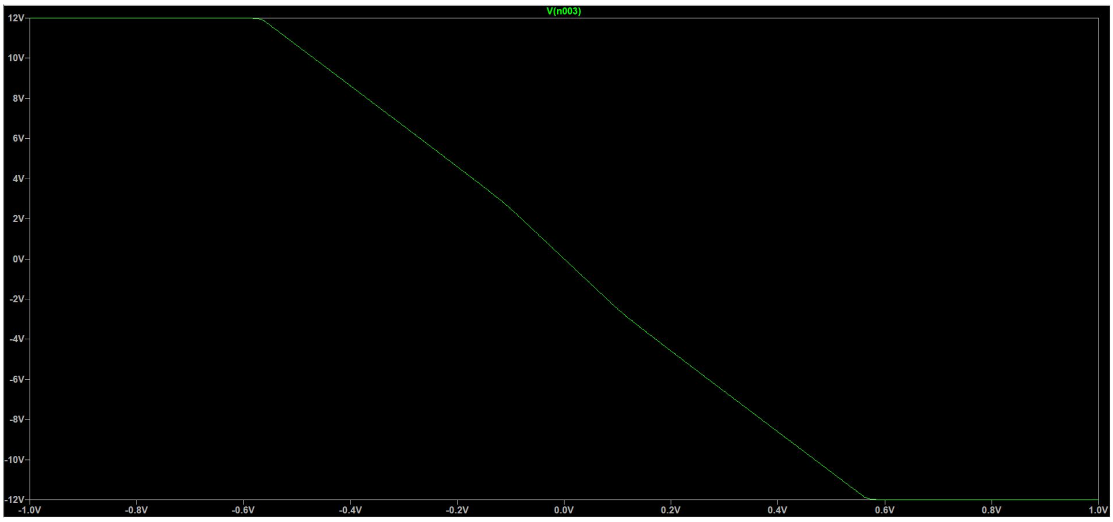
Quand $|A\beta(j\omega)| > 1$ on donne $R_2/R_1 > 29.09$ R_2=30kΩ



7.Le circuit creer est si-dessous :



8. On peut voir le resultat



On peut voir clairement le non-linearite dans ce resultat.