Devoir 4 Électronique

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1 Caractérisation du VCO

1.1

On peut trouver les informations dans le document:

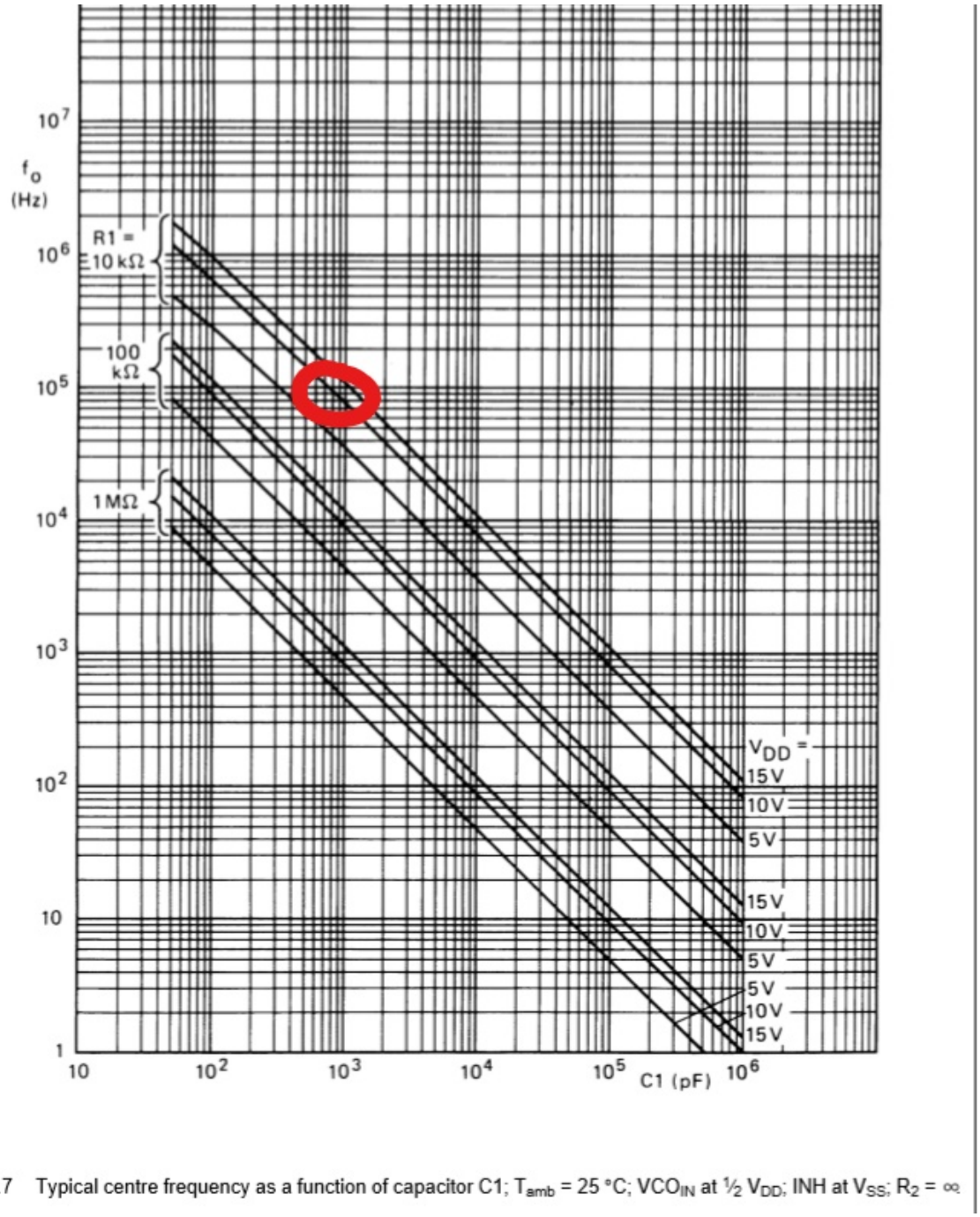


Fig.7 Typical centre frequency as a function of capacitor C1; T_{amb} = 25 °C; VCO_{IN} at ½ V_{DD}; INH at V_{SS}; R_2 = ∞.

On a $V_{dd} = 10V$, donc $f_0 = 80kHz$.

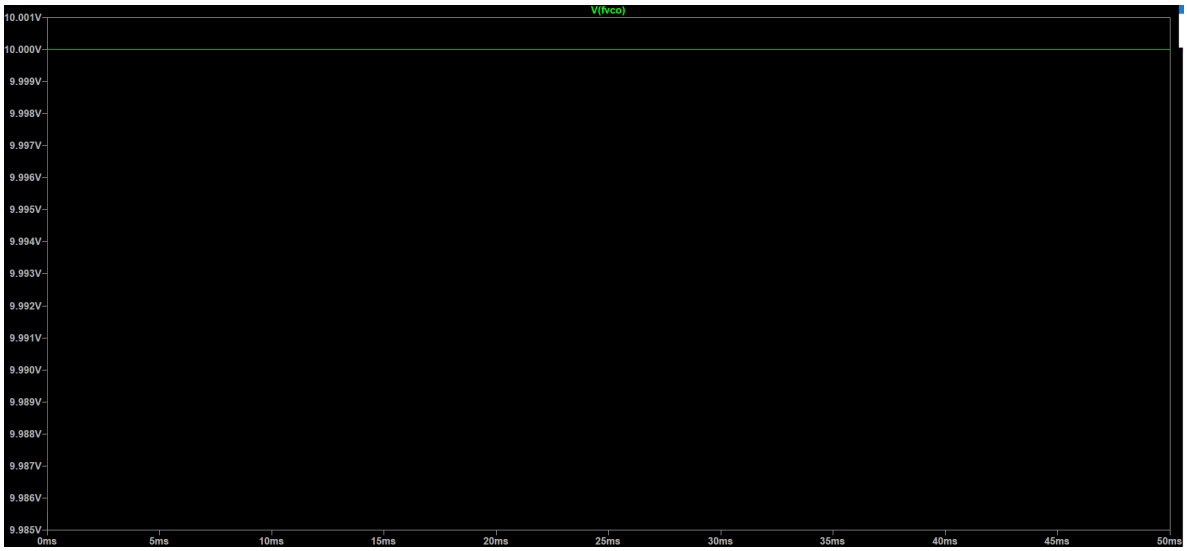
On peut déduire que $f_{max} = 2f_0 = 160kHz$.

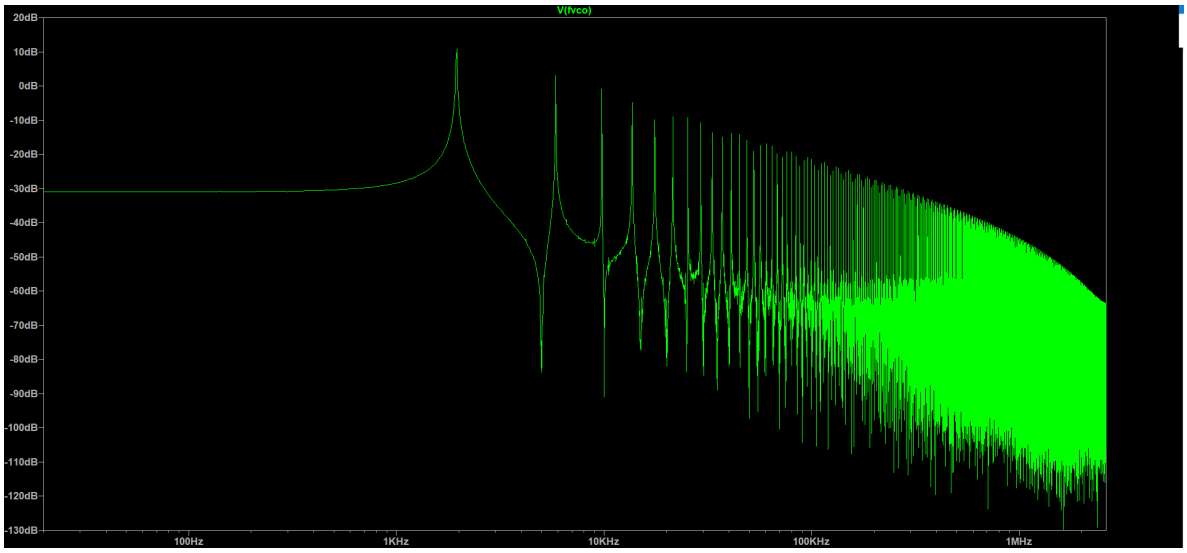
1.2

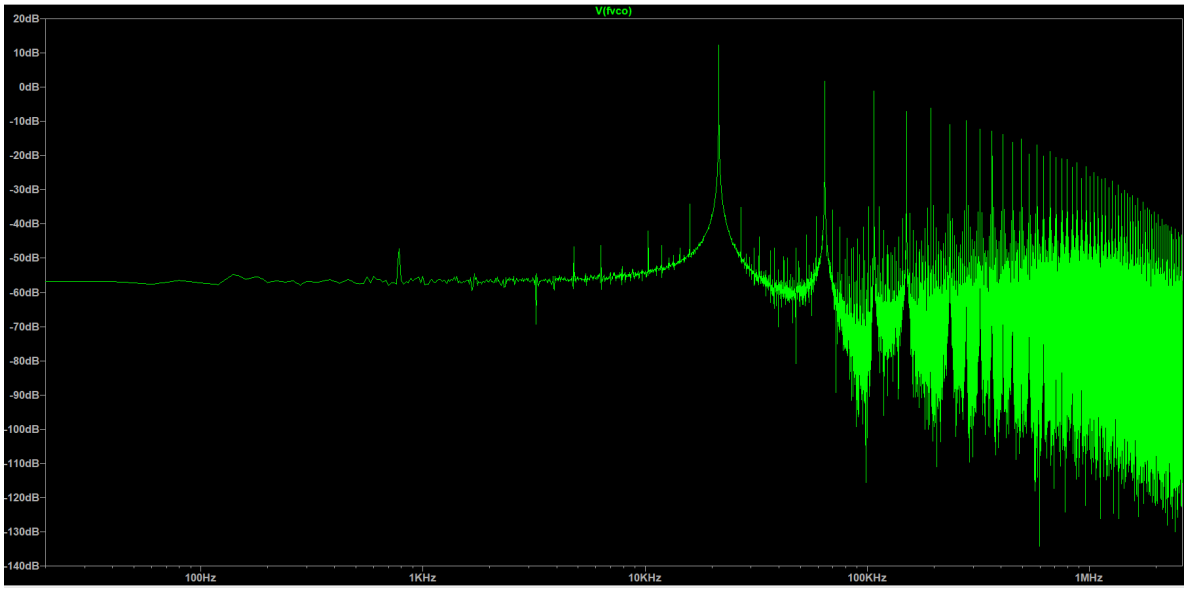
On fait la simulation et obtient les fréquences de la sortie monter linéairement et enfin il peut obtenir $f_{max} = 160kHz$

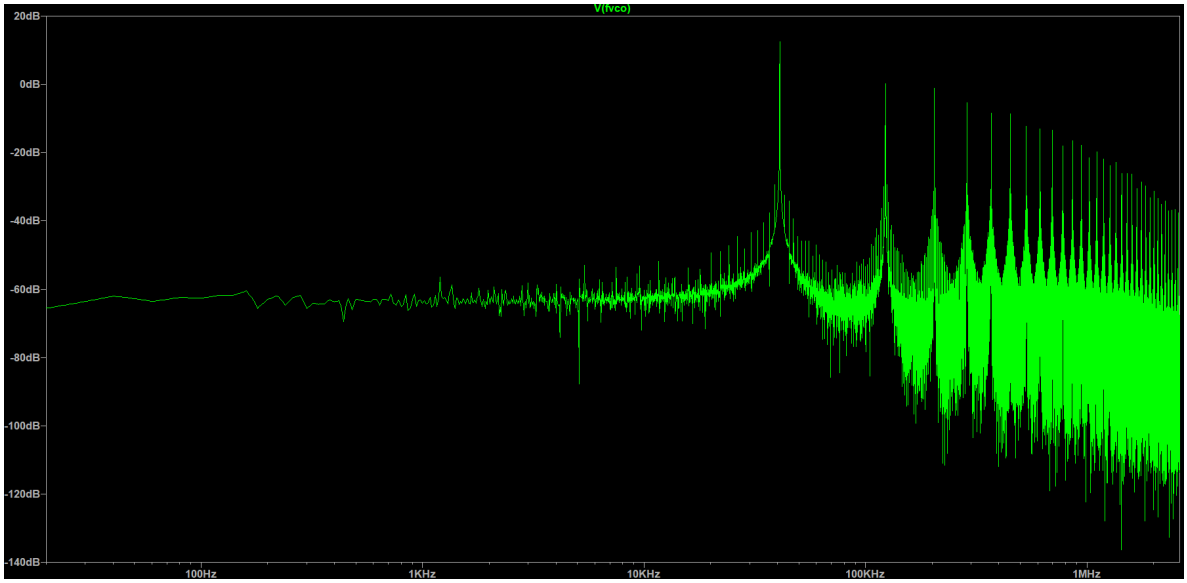
V1	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V
f	0	1.96kHz	21.46kHz	40.98kHz	60.48kHz	80.02kHz	99.52kHz	119.02kHz	138.54kHz	158.04kHz	160.00kHz

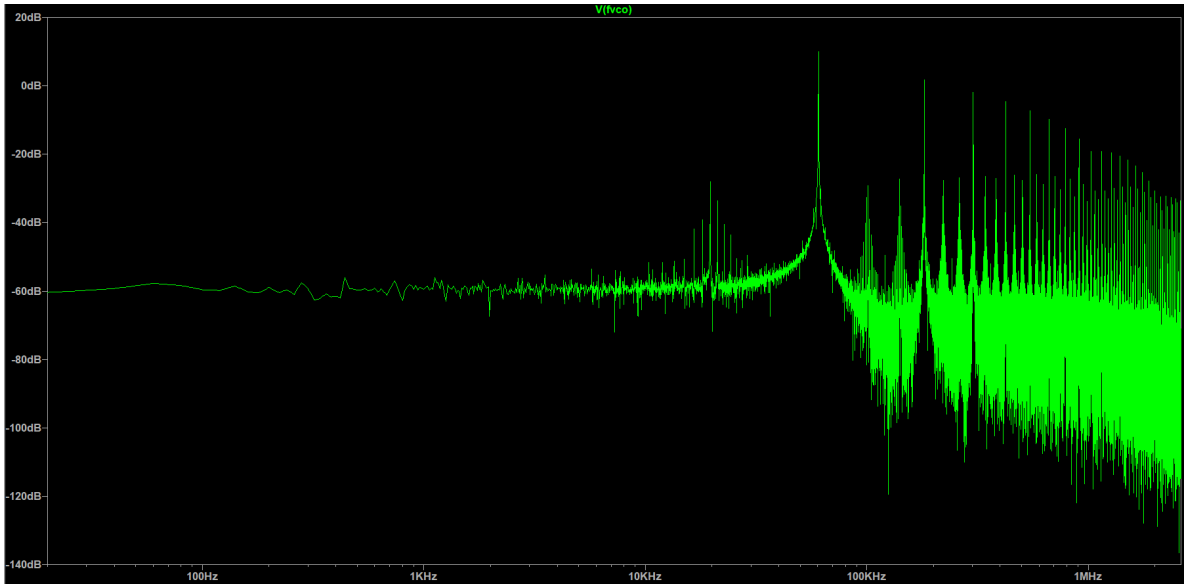
de 0V à 10V:

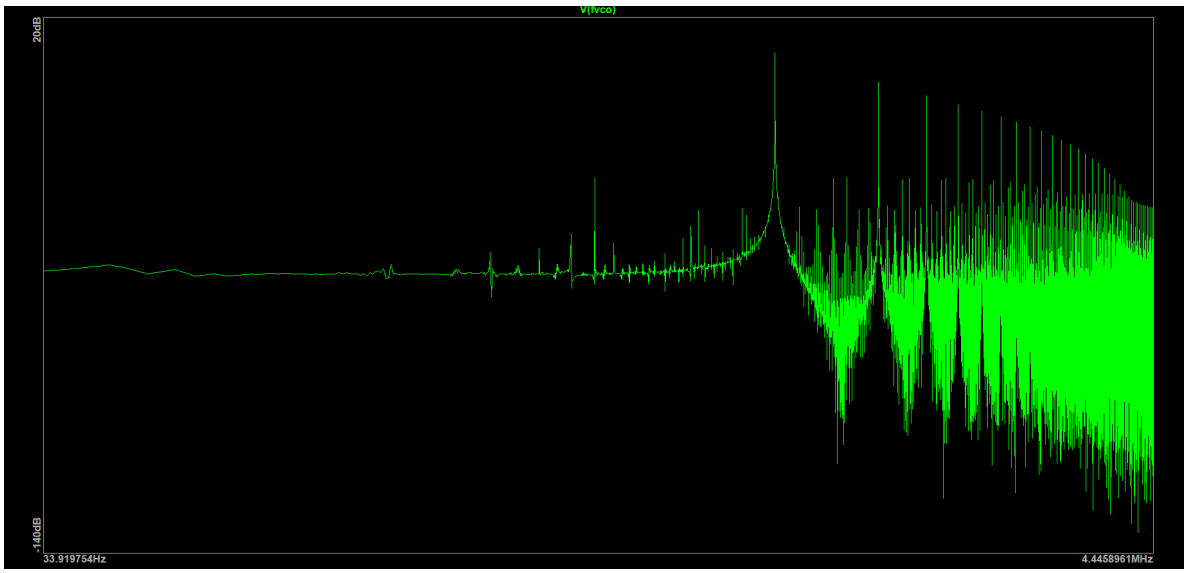


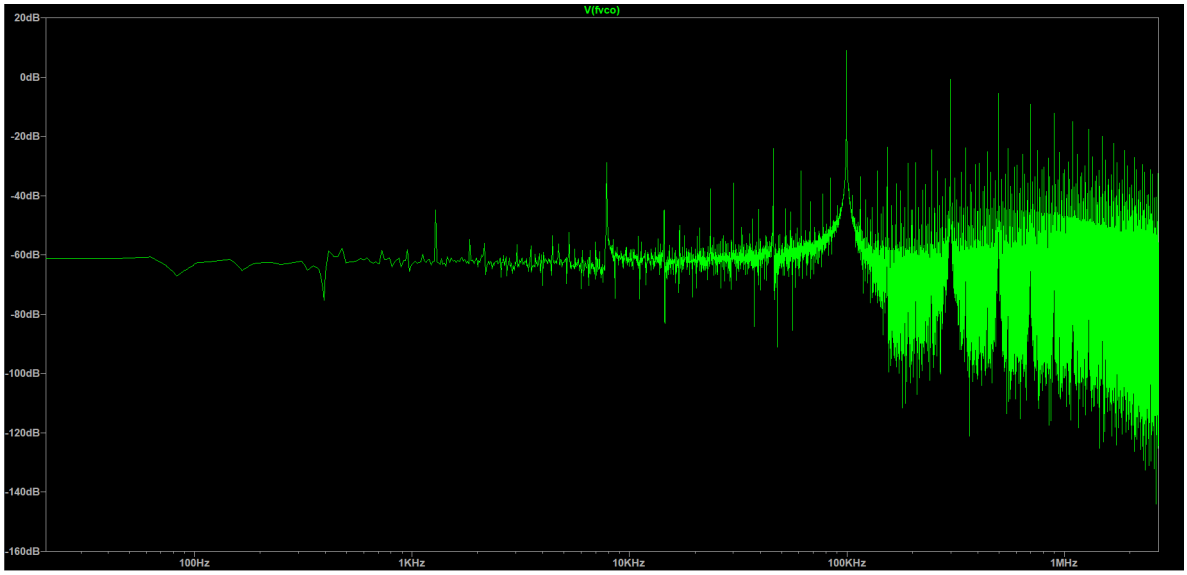


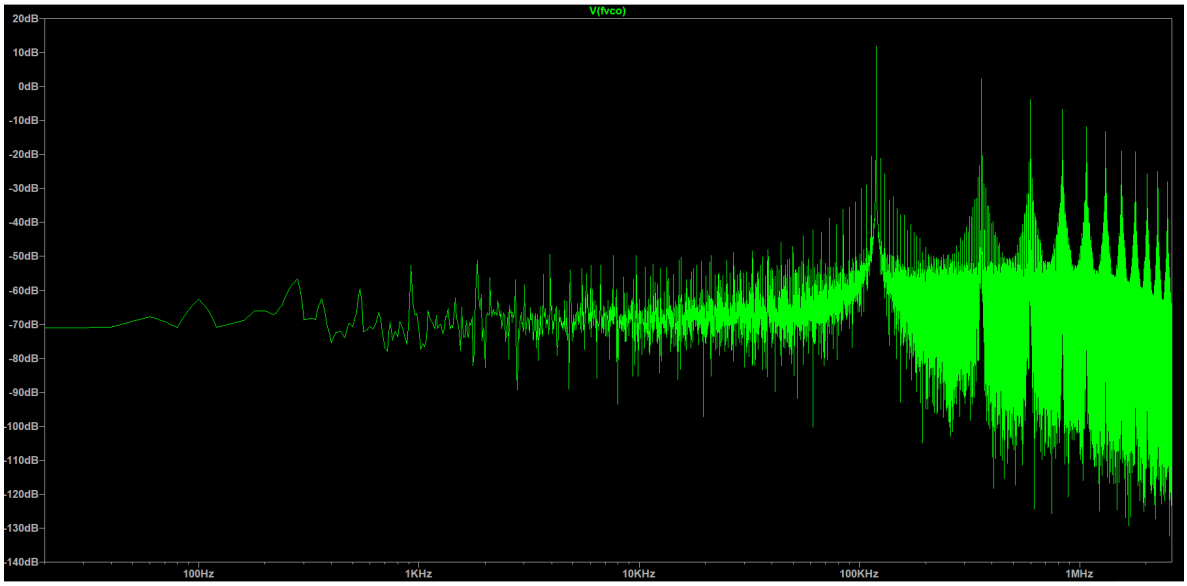


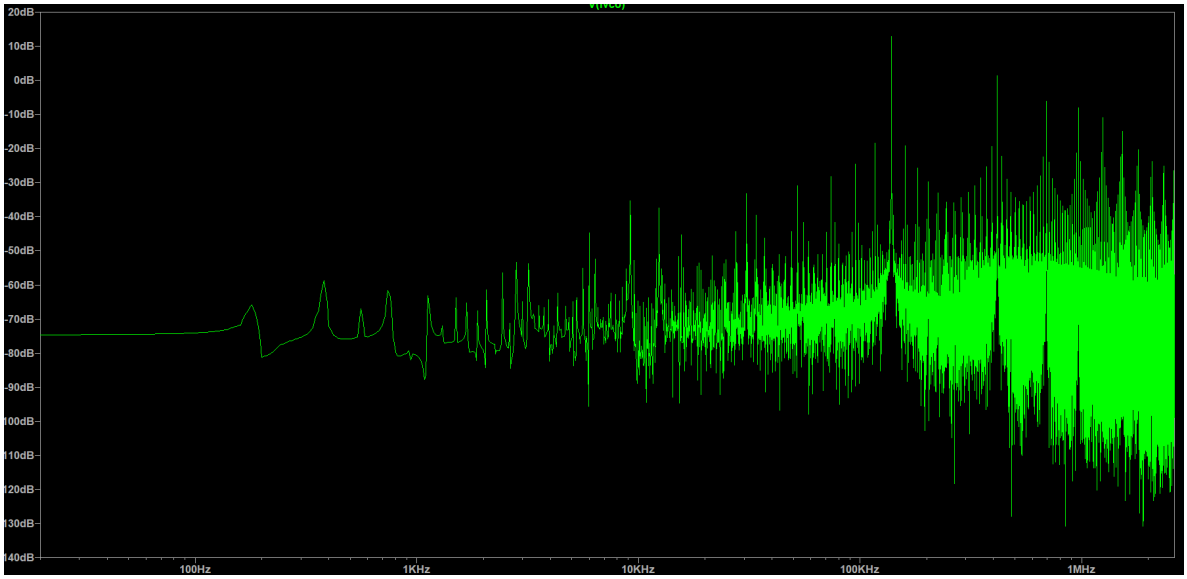

V(fvco)
20dB
0dB
-20dB
-40dB
-60dB
-80dB
-100dB
-120dB
-140dB
100Hz
1KHz
10KHz
100KHz
1MHz

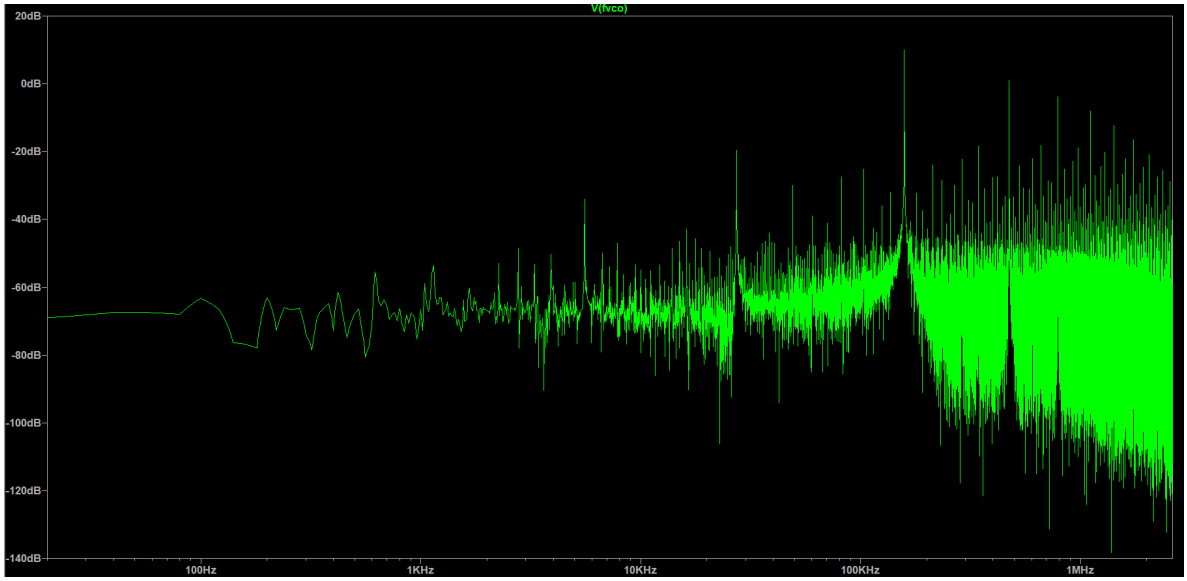

V(fvco)
20dB
0dB
-20dB
-40dB
-60dB
-80dB
-100dB
-120dB
-140dB
100Hz
1KHz
10KHz
100KHz
1MHz

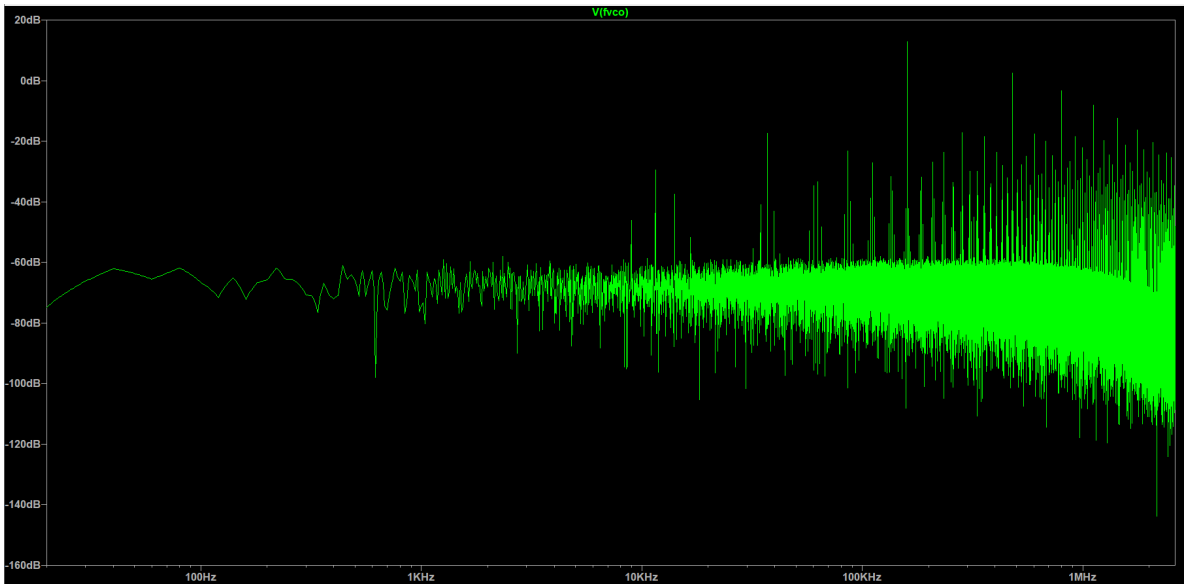

V(fvco)
20dB
-140dB
33.919754Hz
4.4458961MHz


V(fvco)
20dB
0dB
-20dB
-40dB
-60dB
-80dB
-100dB
-120dB
-140dB
-160dB
100Hz
1KHz
10KHz
100KHz
1MHz


V(fvco)
20dB
10dB
0dB
-10dB
-20dB
-30dB
-40dB
-50dB
-60dB
-70dB
-80dB
-90dB
-100dB
-110dB
-120dB
-130dB
-140dB
100Hz
1KHz
10KHz
100KHz
1MHz


20dB
10dB
0dB
-10dB
-20dB
-30dB
-40dB
-50dB
-60dB
-70dB
-80dB
-90dB
100dB
110dB
120dB
130dB
140dB
100Hz
1KHz
10KHz
100KHz
1MHz



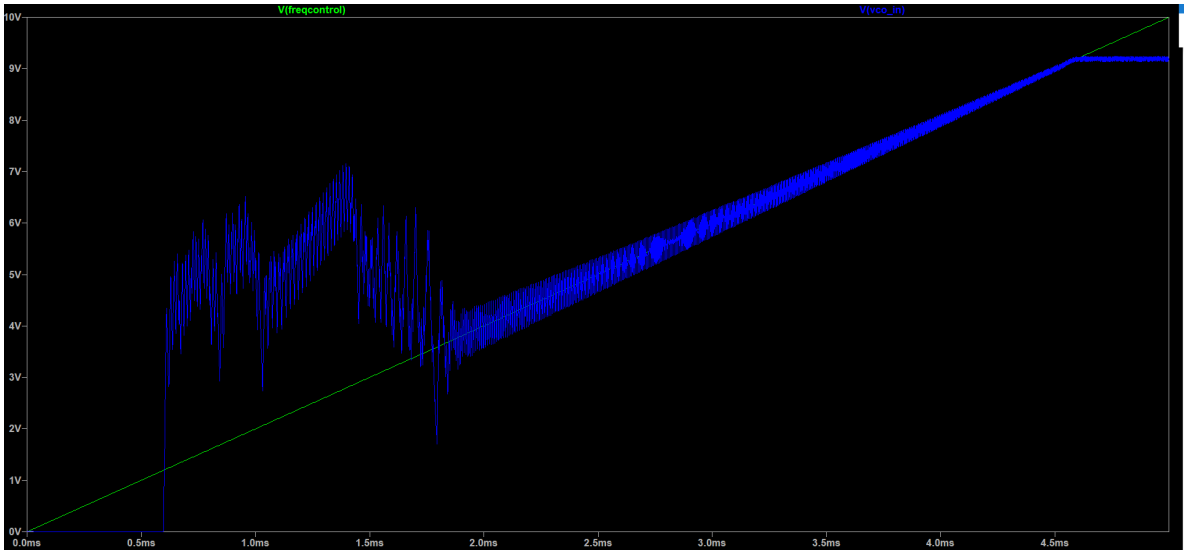


2 Mesure des plages de capture et de verrouillage

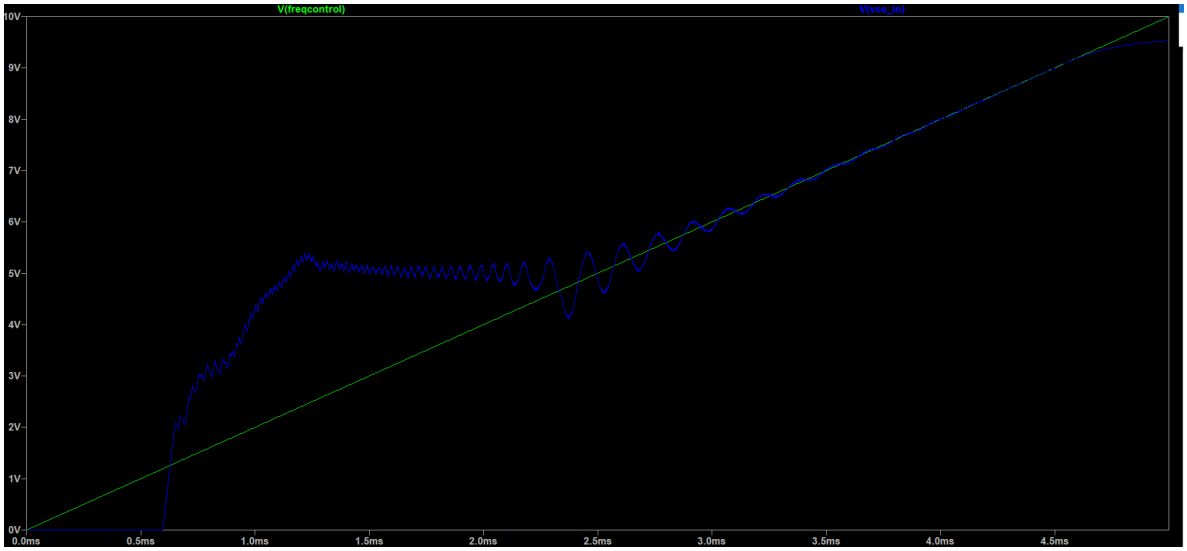
2.3

pc_1 :

Quand $C_2 = 10nF$, on a:

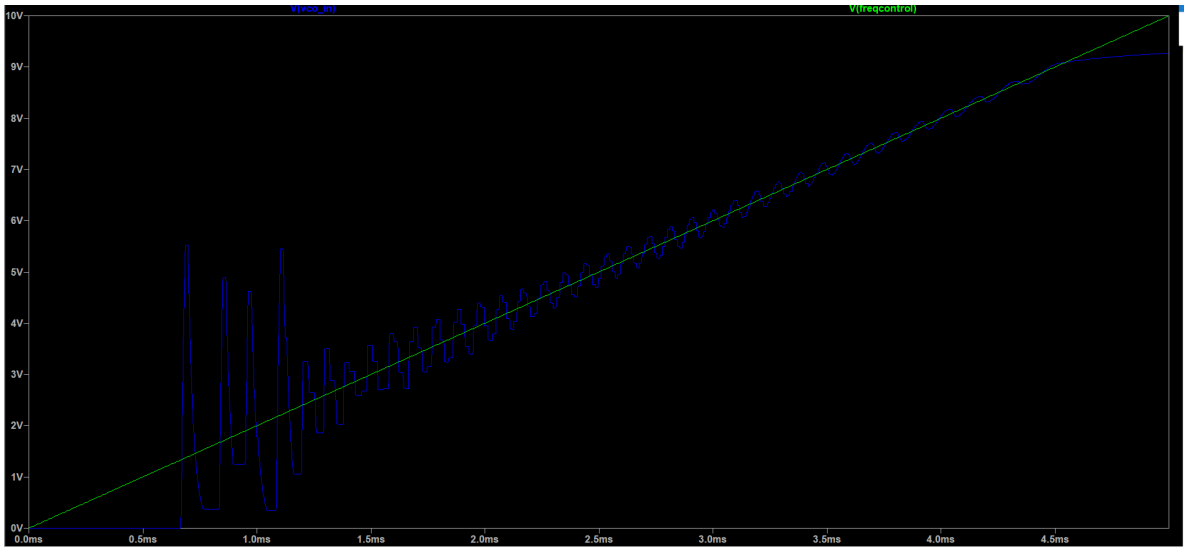


Quand $C_2 = 100nF$, on a:

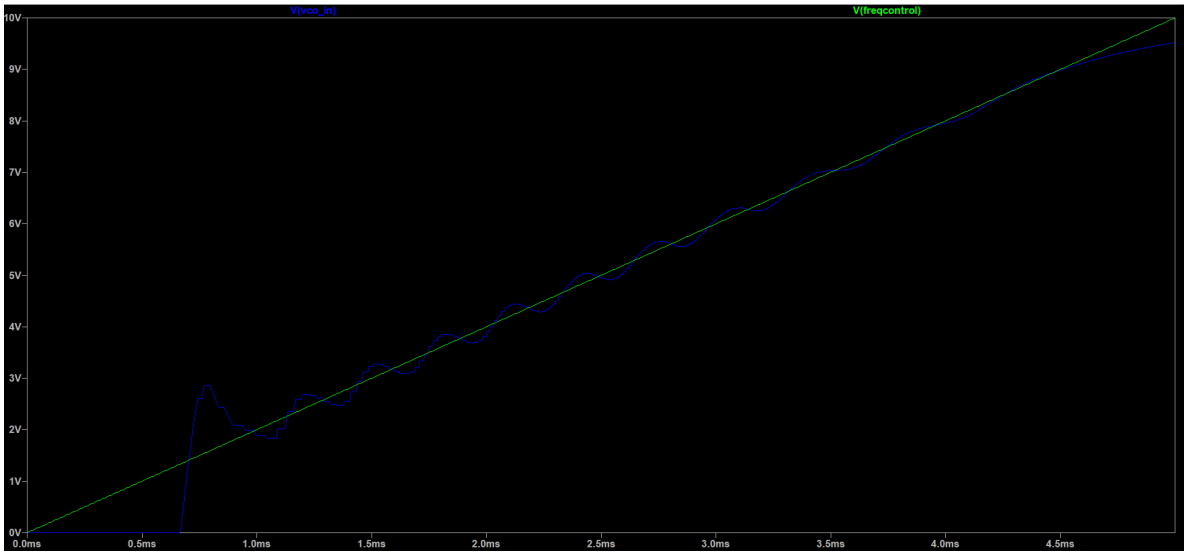


pc_2:

Quand $C_2 = 10nF$, on a:



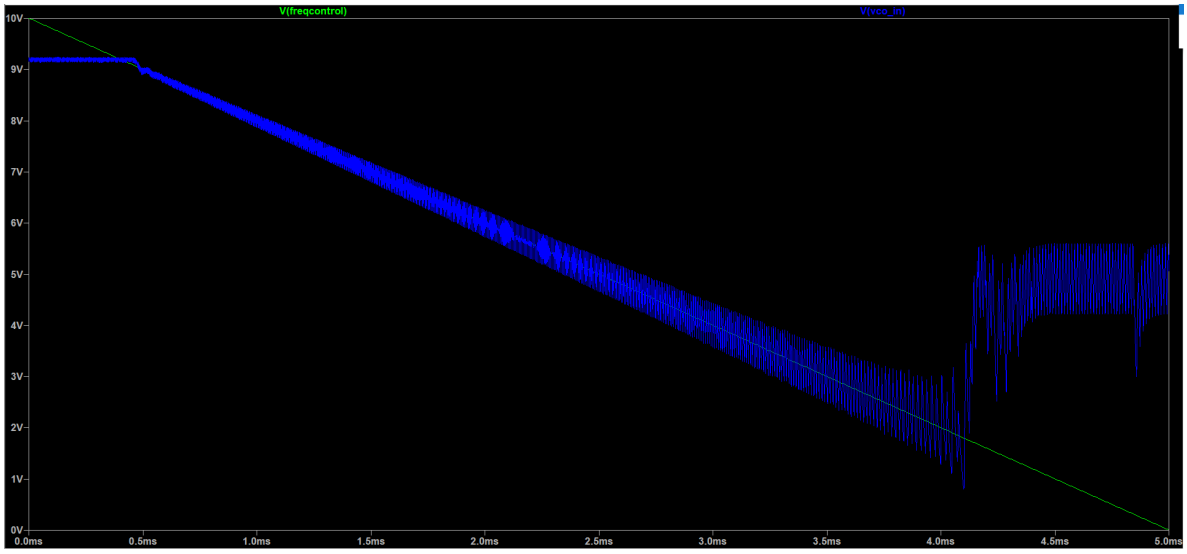
Quand $C_2 = 100nF$, on a:



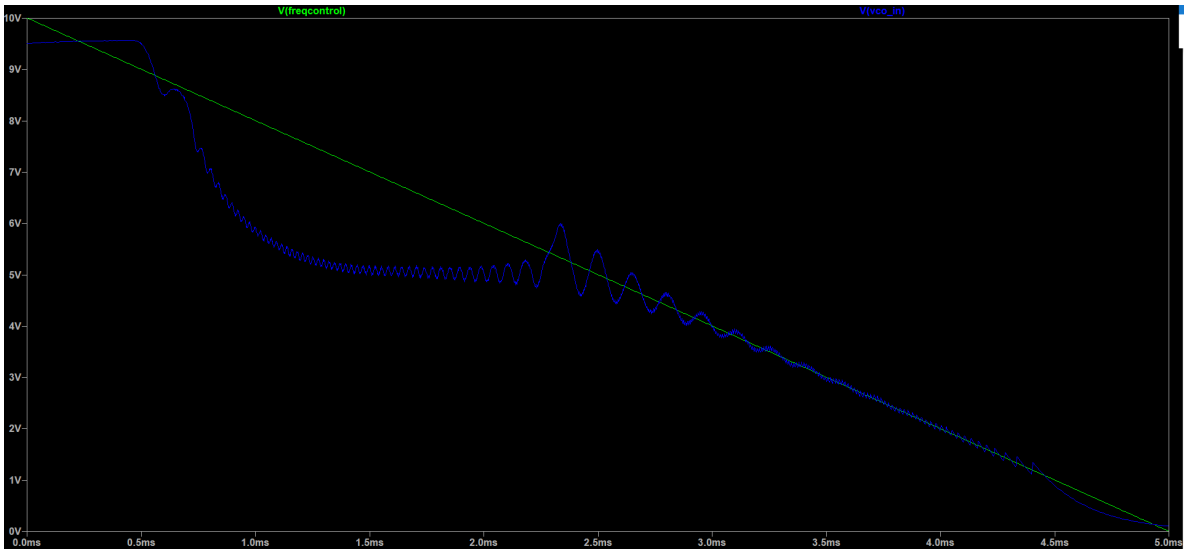
2.4

pc_1:

Quand $C_2 = 10nF$, on a:

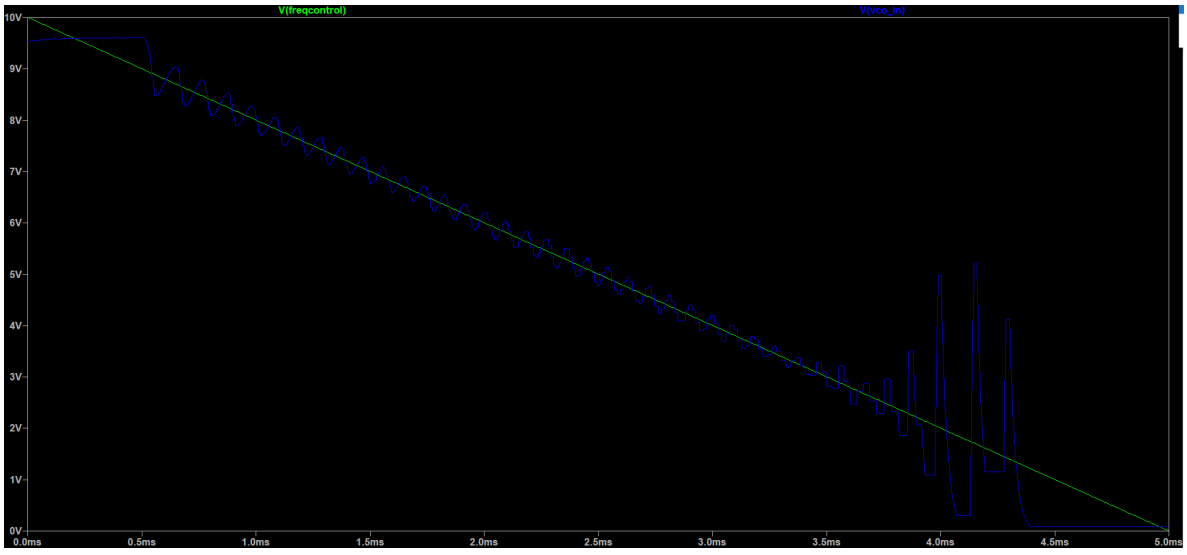


Quand $C_2 = 100nF$, on a:

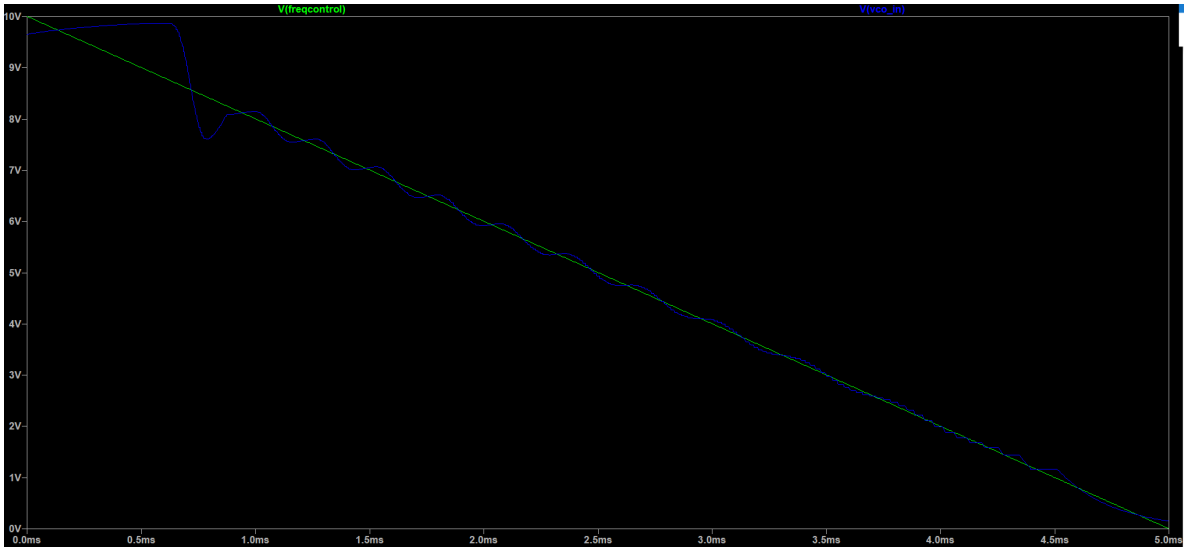


pc_2:

Quand $C_2 = 10nF$, on a:



Quand $C_2 = 100nF$, on a:

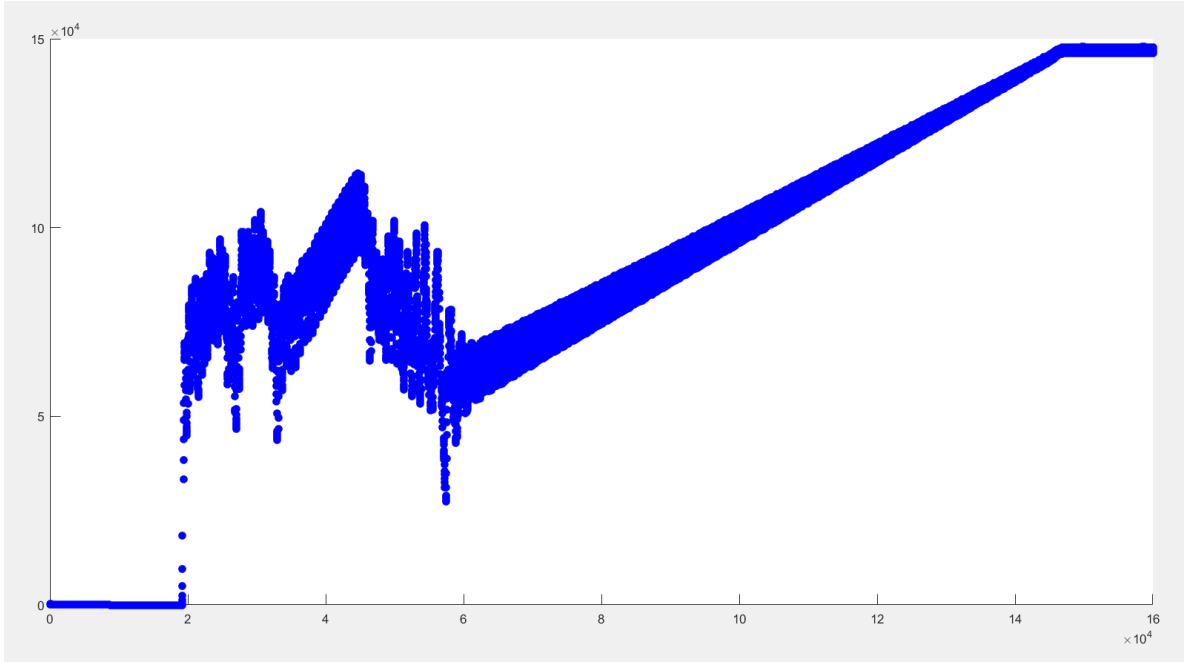


2.5

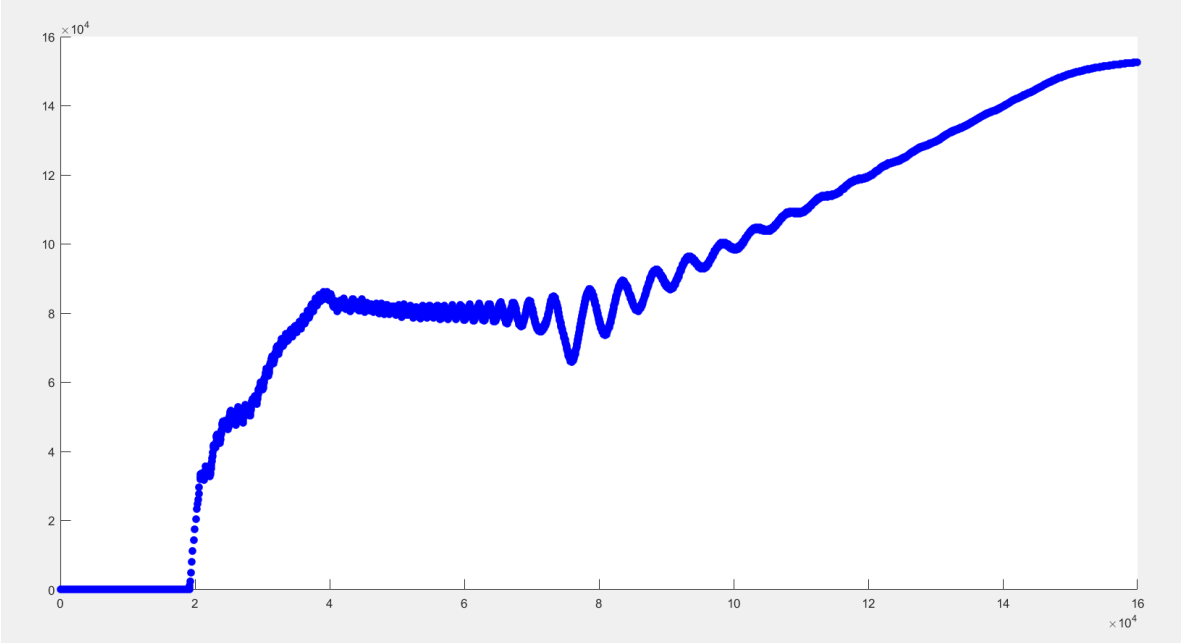
pc_1 :

croissant

$C_2 = 10nF$

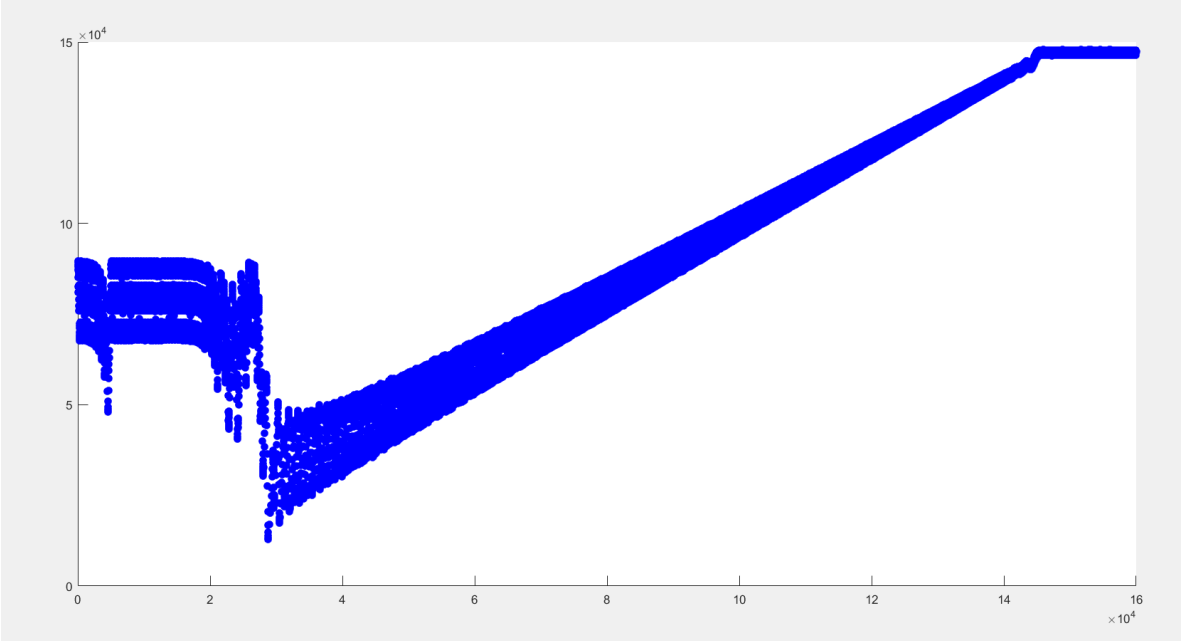


$C_2 = 100nF$



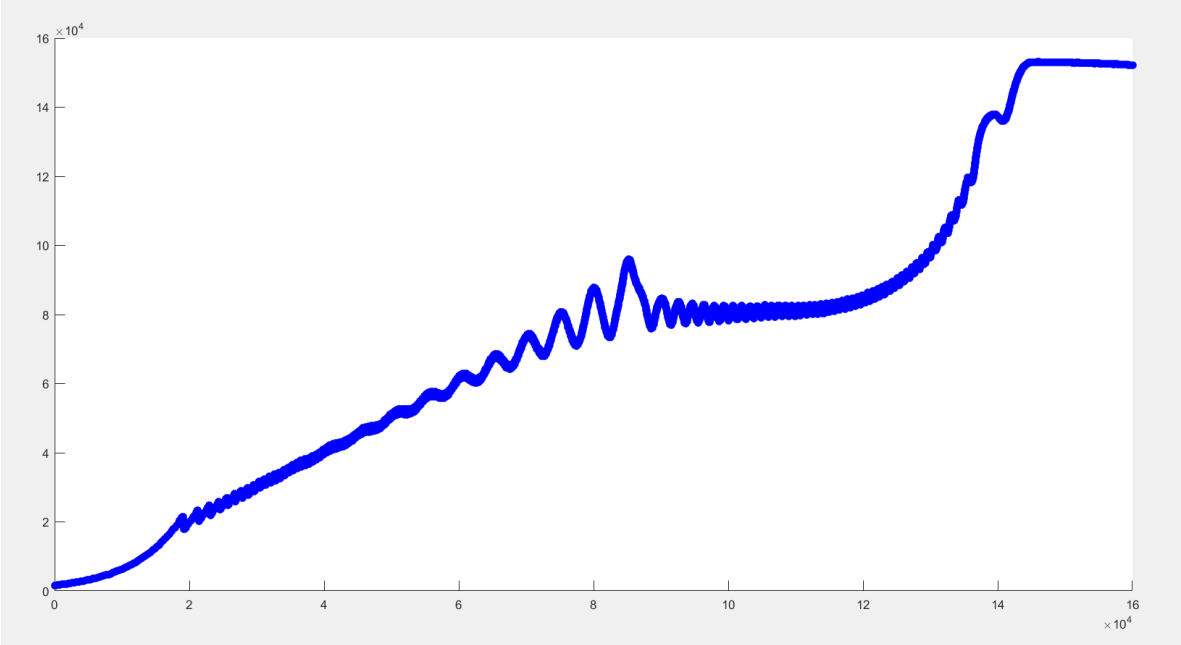
décroissant

$C_2 = 10nF$



$plage \quad de \quad verrouillage \approx 88kHz$

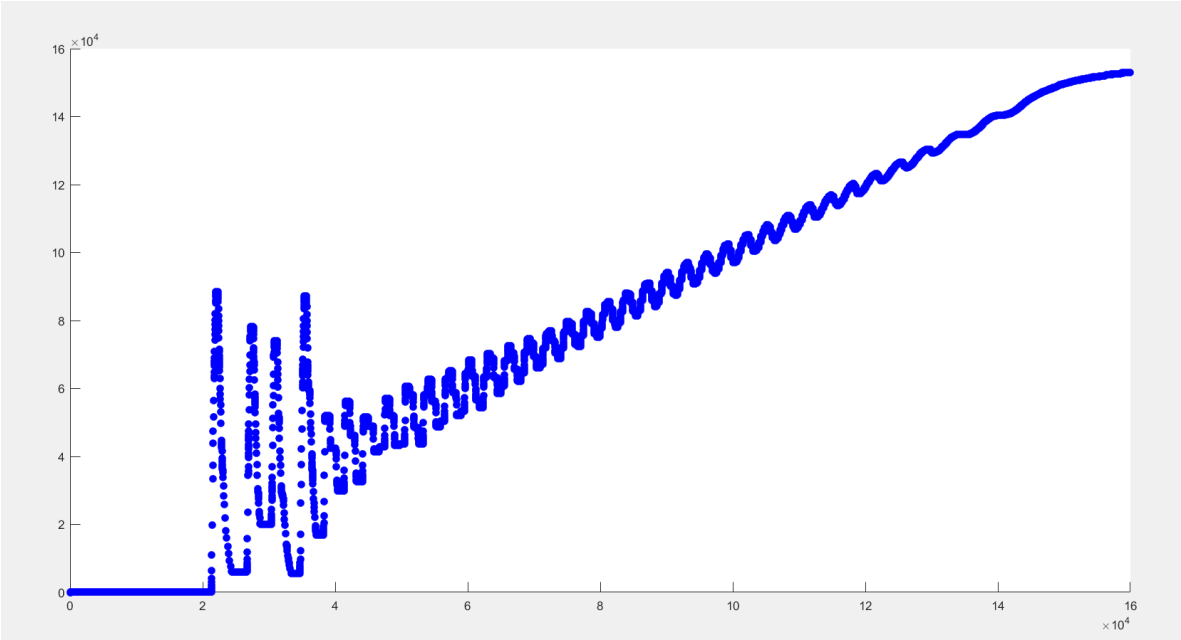
$C_2 = 100nF$



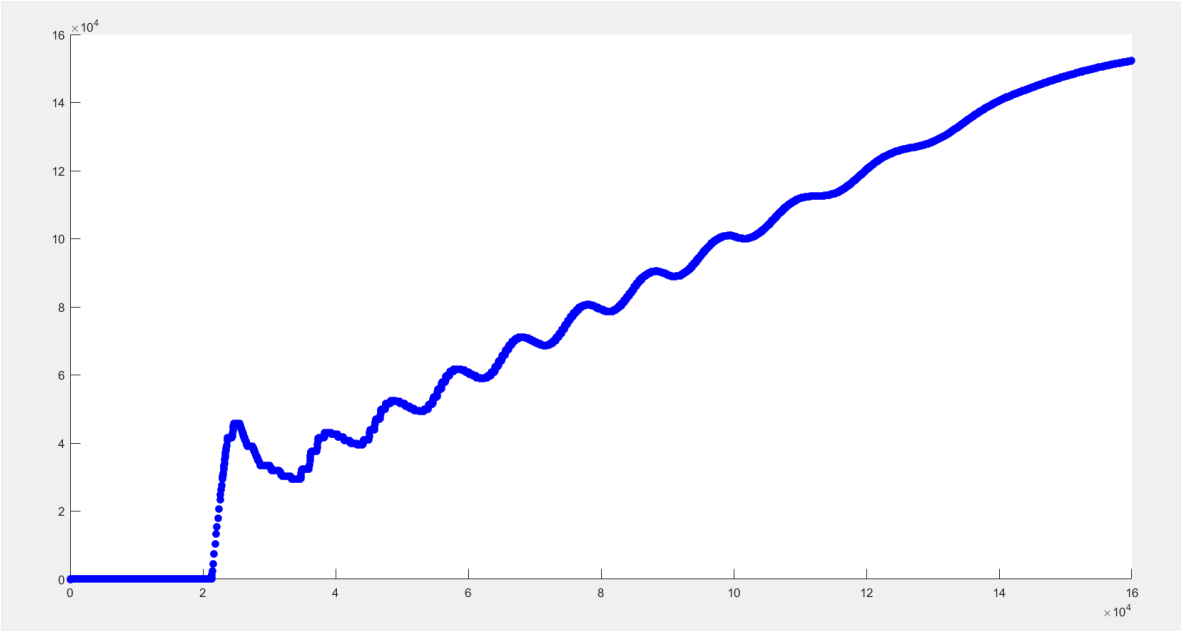
pc_2 :

croissant

$C_2 = 10nF$

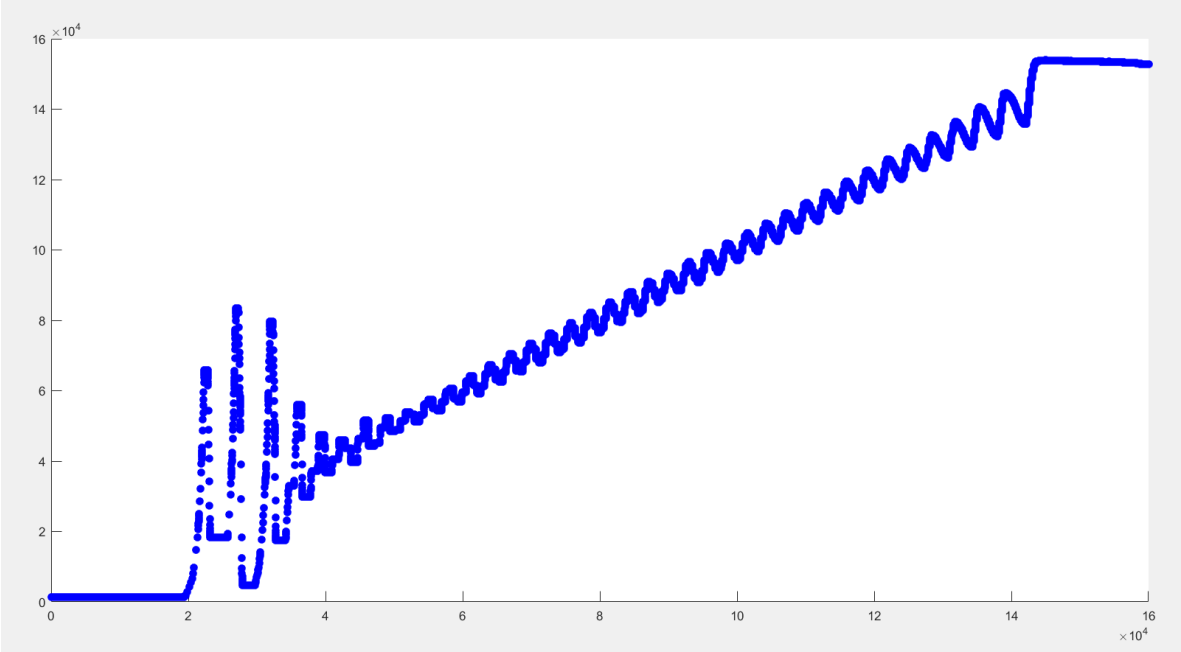


$C_2 = 100nF$

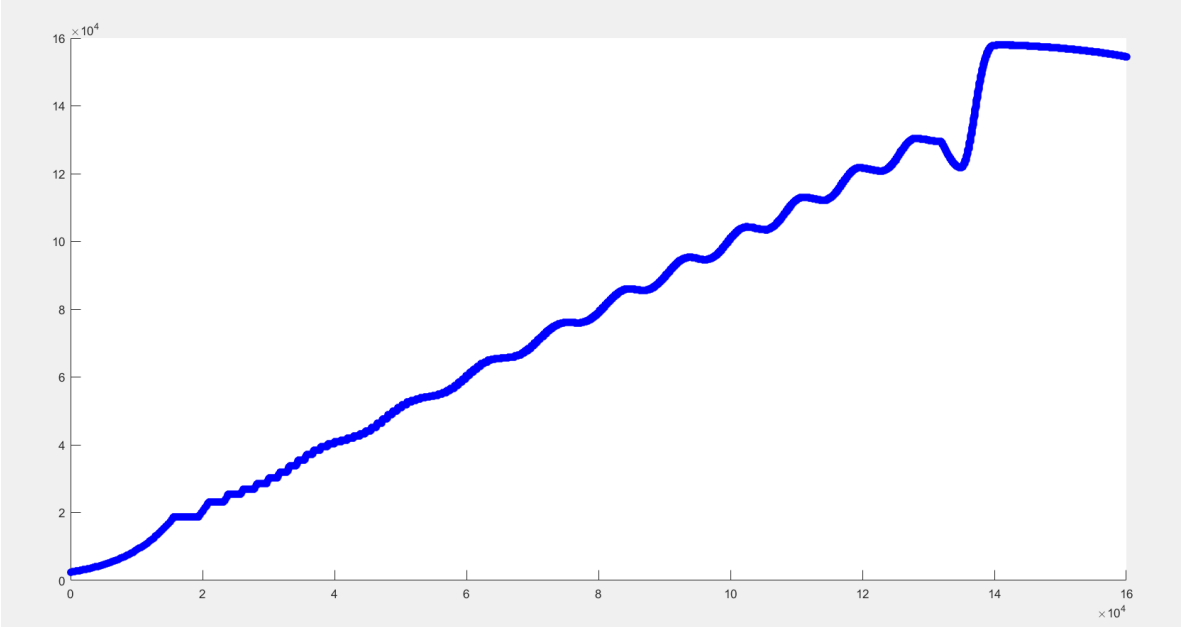


décroissant:

$C_2 = 10nF$



$C_2 = 100nF$

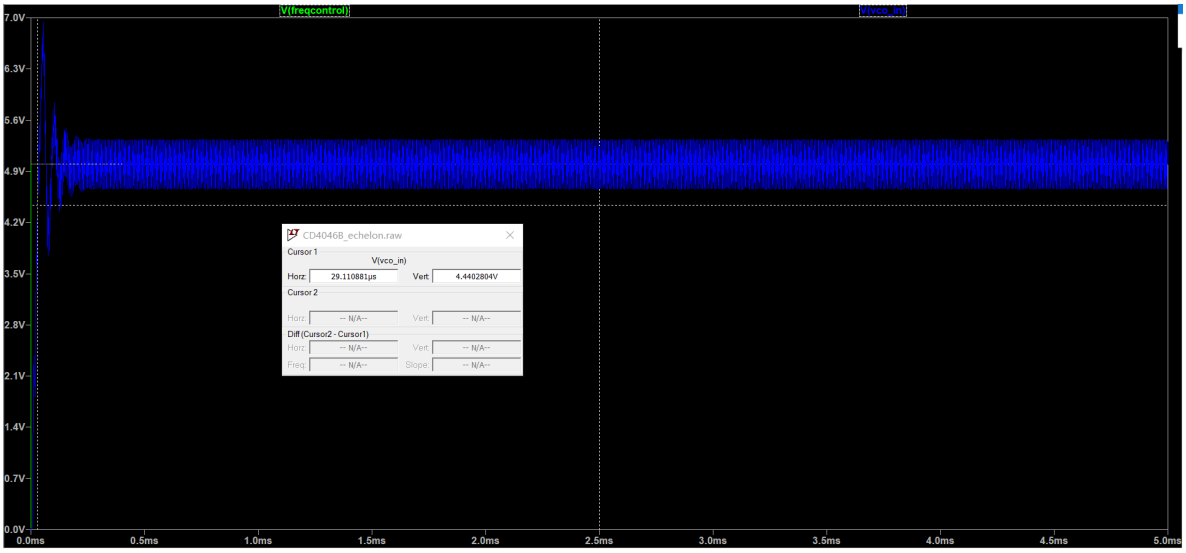


3 Réponse de la PLL à un échelon

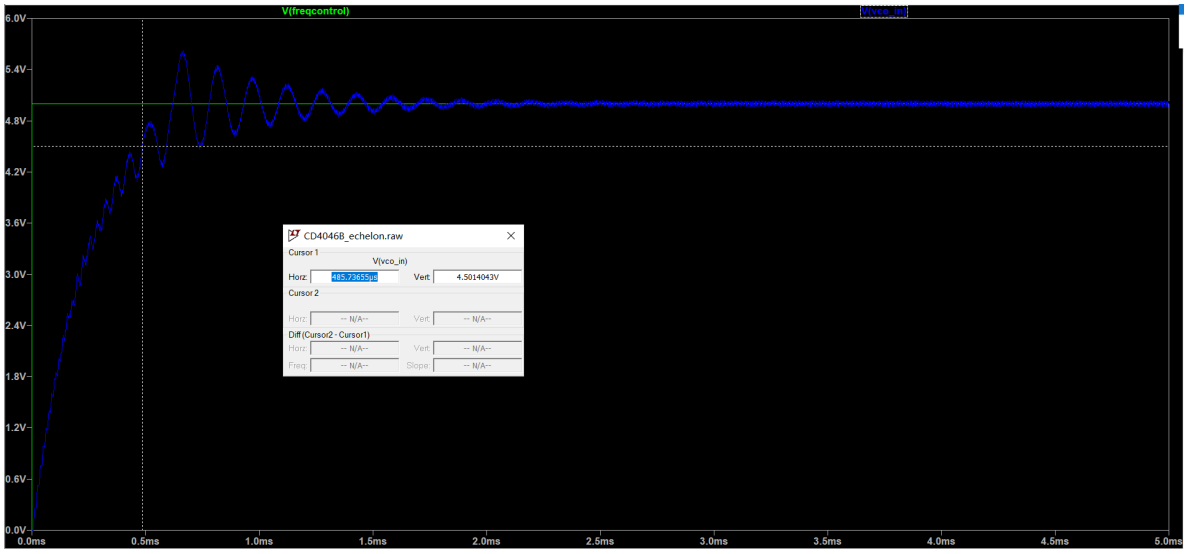
3.1 3.2

pc_1

$C_2 = 10nF$, on a:

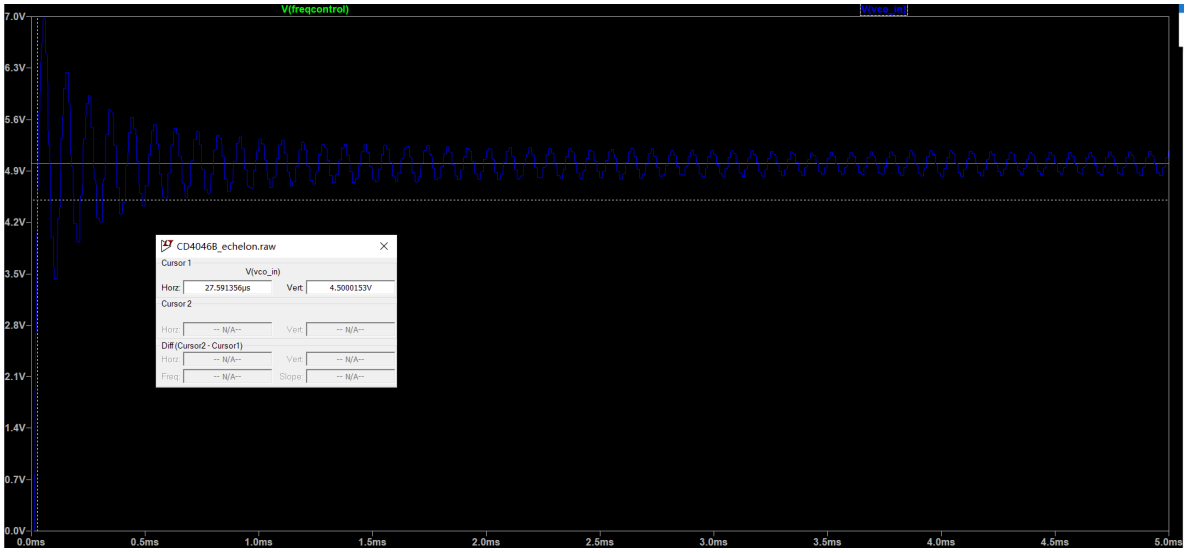


$C_2 = 100nF$, on a:

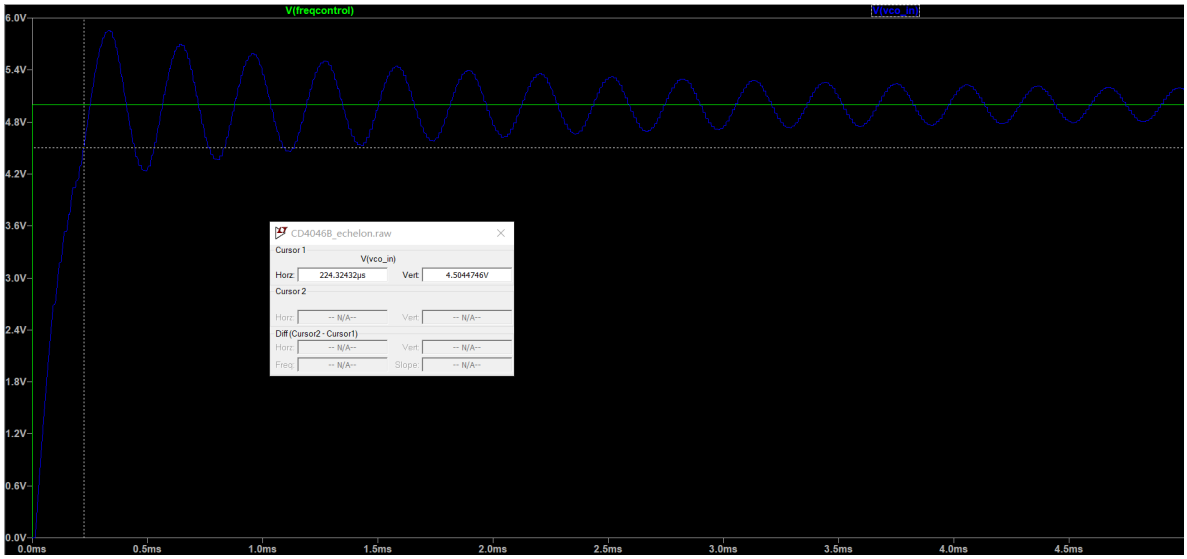


pc_2

$C_2 = 10nF$, on a:



$C_2 = 100nF$, on a:



3.3

On a $\tau = R_3 \times C_2$

Quand $C_2 = 100nF$, $\tau = 180\mu s$

Quand $C_2 = 10nF$, $\tau = 18\mu s$

On peut voir les résultats des simulations sont tous plus lentement que les résultats théoriquement.