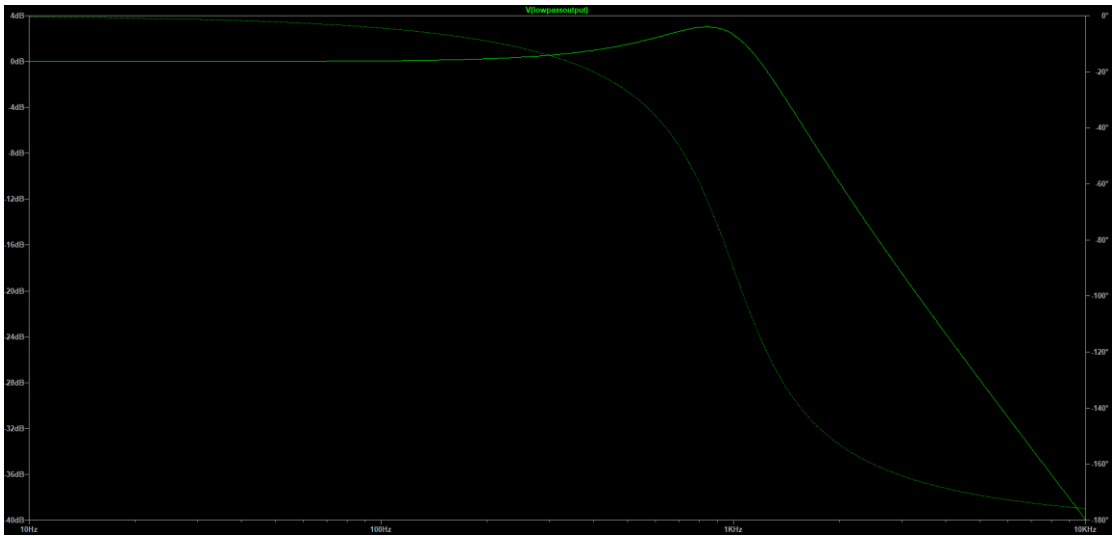
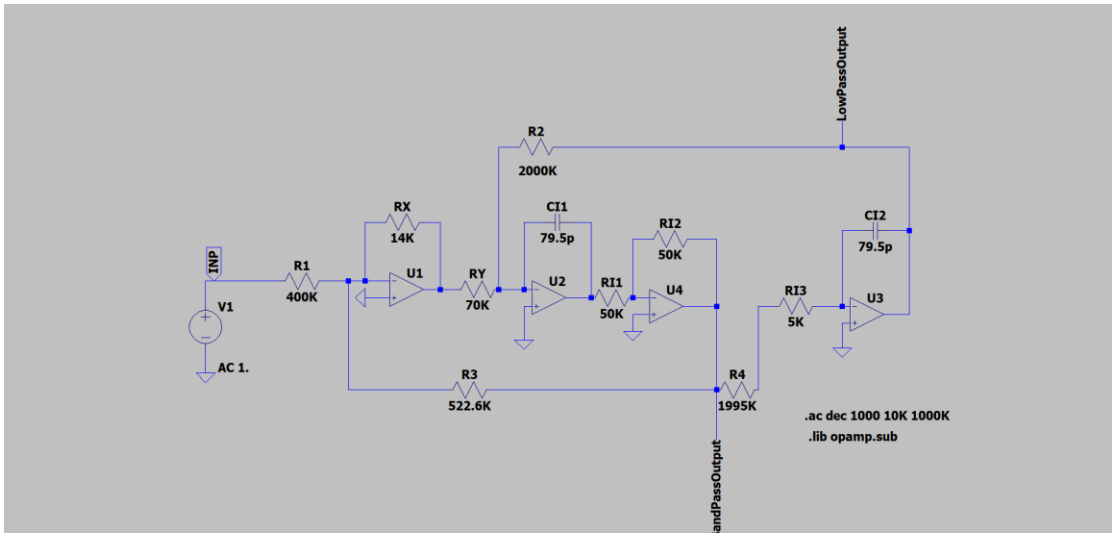
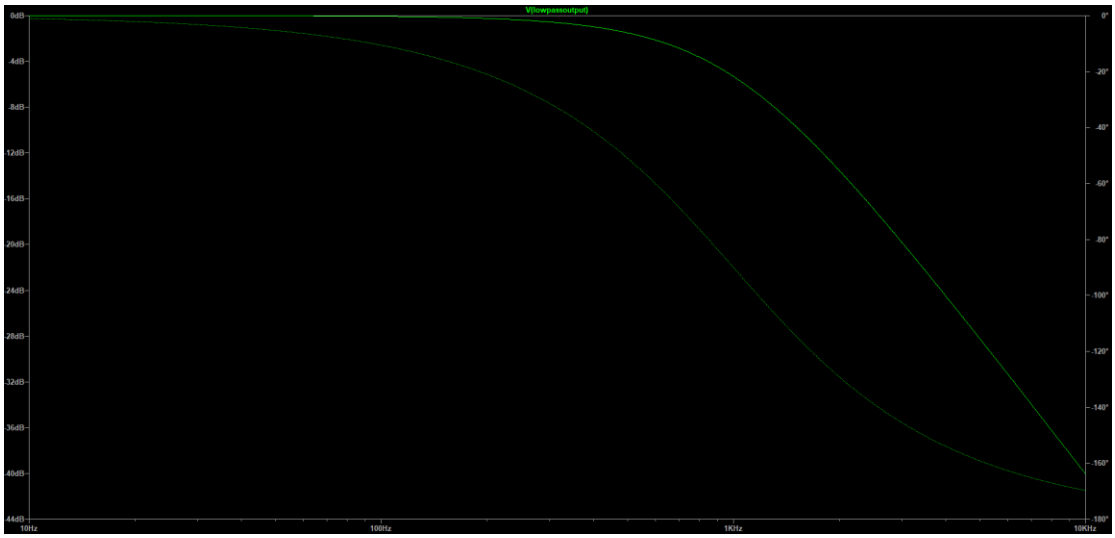
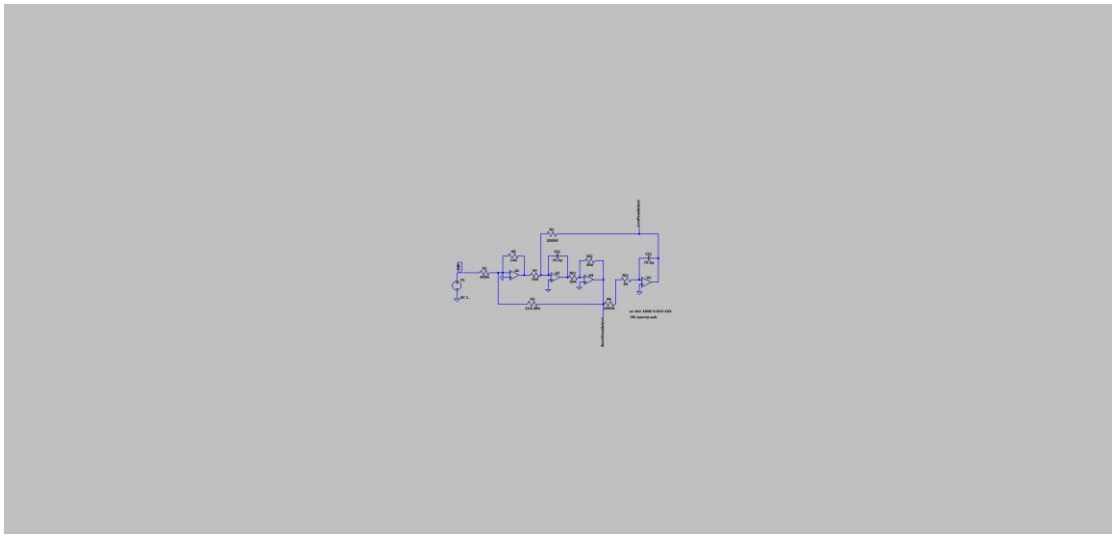
1.



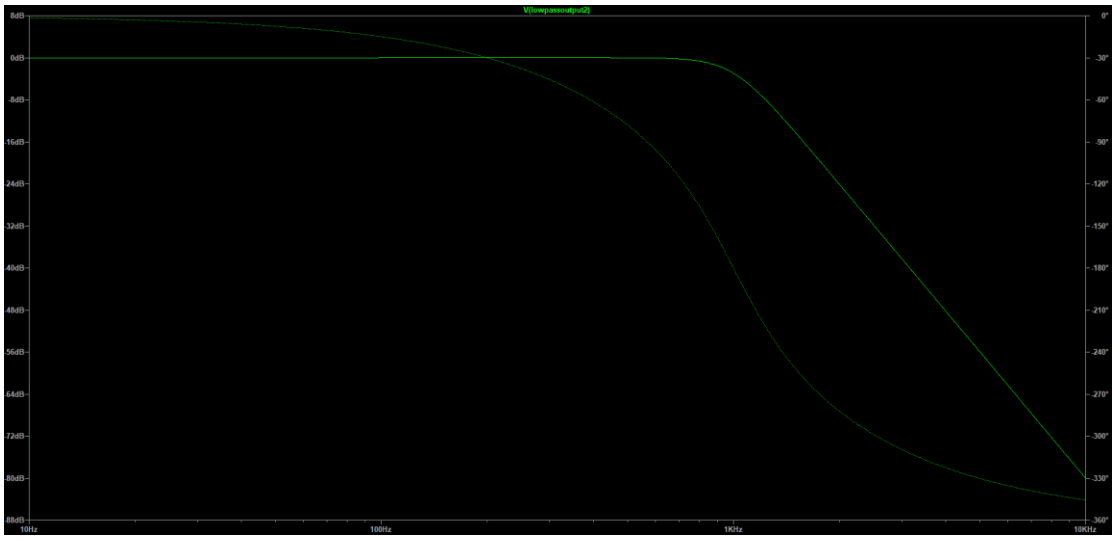


Premier filtre





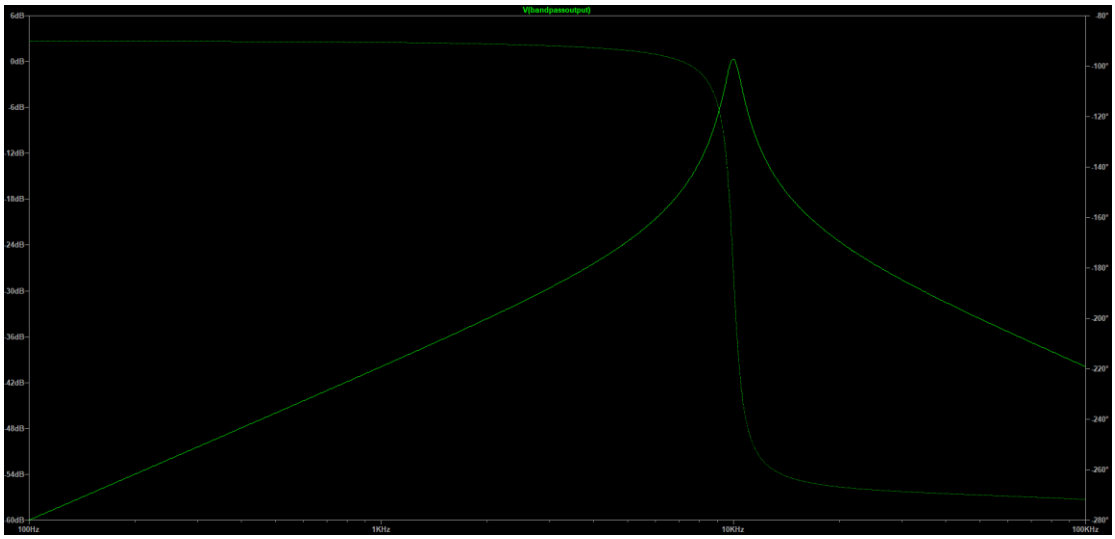
Deuxième filtre

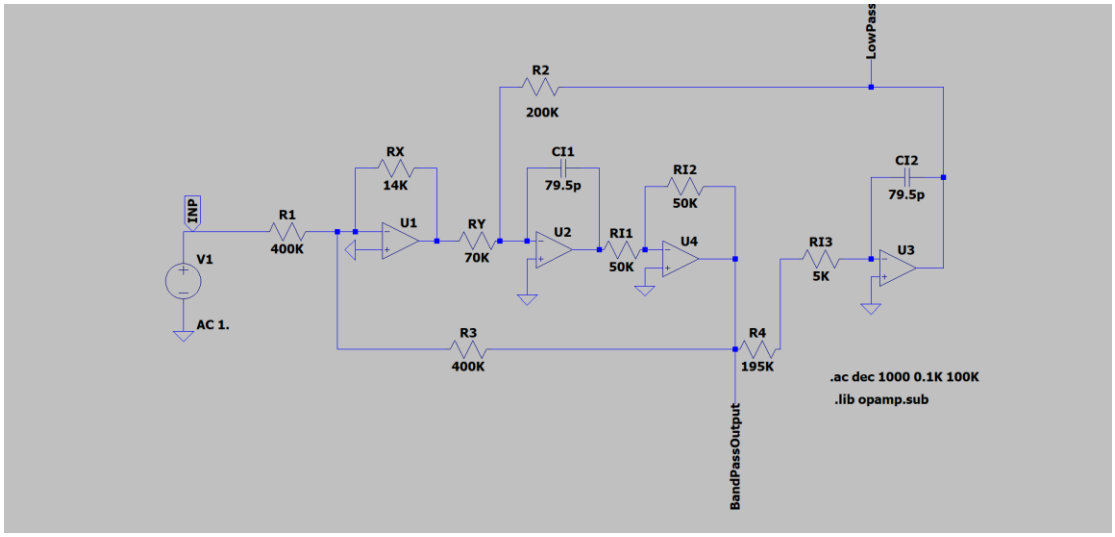


Ensemble

À 1KHZ, le gain est -2.9941388dB. À 4 KHZ, le gain est -48.218789dB. Donc les deux étages répondent bien au cahier des charges.

2.





On peut calculer que $f_1 = 9.51249KHZ$, $f_2 = 10.51249KHZ$, $f_1' = 8.61187KHZ$, $f_2' = 11.61187KHZ$

Alors, on trouve que quand G = -3db :

9.46237161365695e+003 (-3.20667864458297e+000dB,-1.31827685155269e+002?

1.05438689639115e+004 (-3.22896991115409e+000dB,1.31230076539875e+002?

$f_1 = 9.46237KHZ$

$f_2 = 10.54386KHZ$

Donc $B = 1.08149KHZ \approx 1KHZ$

Alors, on trouve que quand G = -10db :

8.59013521505308e+003 (-1.00424385670617e+001dB,-1.07794535530831e+002?

1.16144861384022e+004 (-1.00555105514880e+001dB,1.07295254696399e+002?

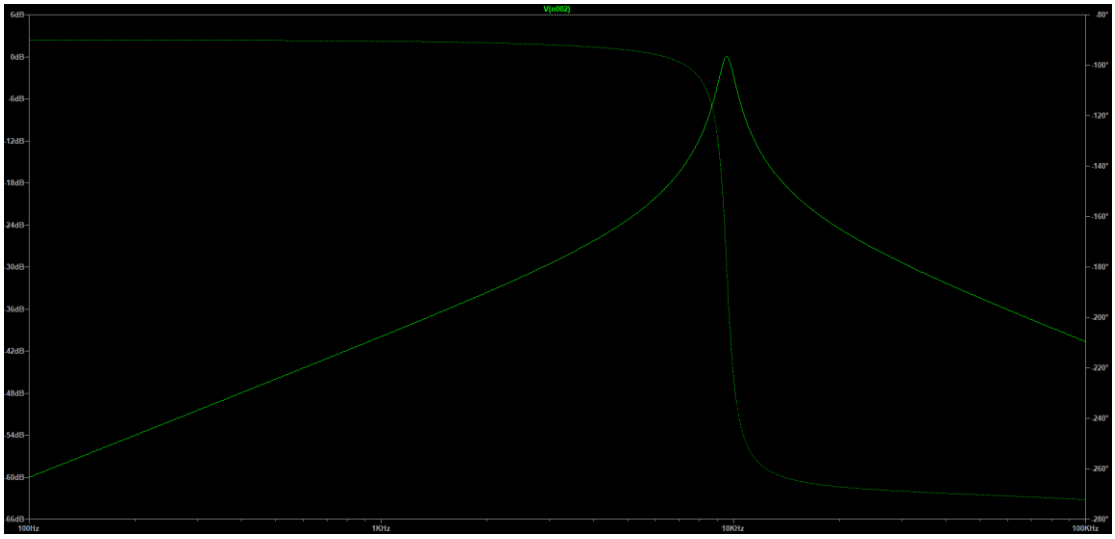
$f_1' = 8.59013KHZ$

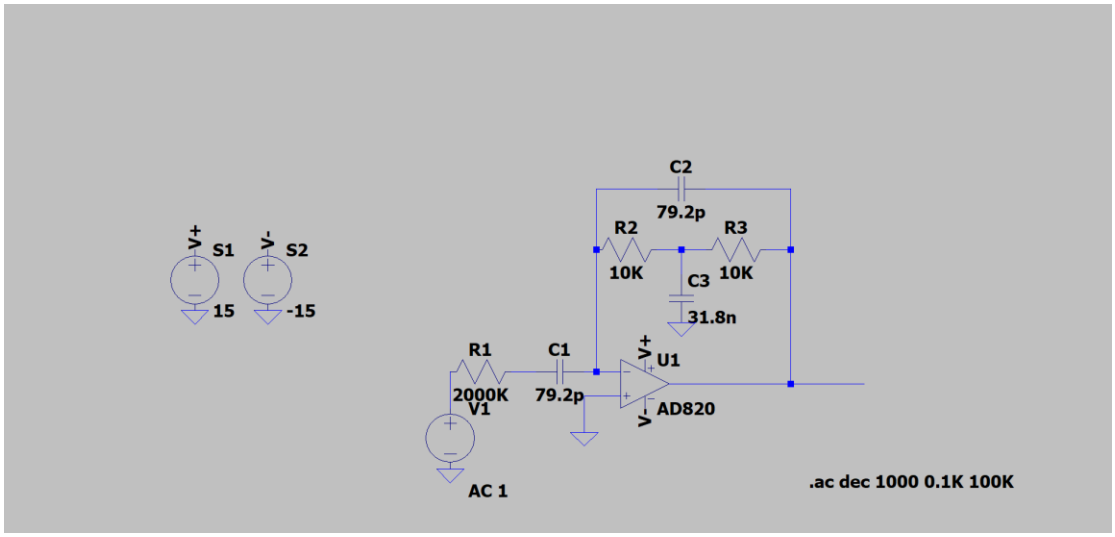
$f_2' = 11.61448KHZ$

Donc $B' = 3.02435KHZ \approx 3KHZ$

Donc le filtre répond bien au cahier des charges.

3.





Alors, on trouve que quand G = -3db :

9.09913272632158e+003 (-3.20795822078232e+000dB,-1.33773514849695e+002?

1.00461579027829e+004 (-3.10121773376049e+000dB,1.33960152342599e+002?

$f_1 = 9.09913KHZ$

$f_2 = 10.04615KHZ$

Donc $B = 0.94702KHZ \approx 1KHZ$

Alors, on trouve que quand G = -10db :

8.27942163712250e+003 (-1.00866949805113e+001dB,-1.08388203004014e+002?

1.10407861990195e+004 (-1.00223798160384e+001dB,1.08033126328490e+002?

$f_1' = 8.27942KHZ$

$f_2' = 11.04078KHZ$

Donc $B' = 2.76136KHZ \approx 3KHZ$

Donc le filtre répond bien au cahier des charges.