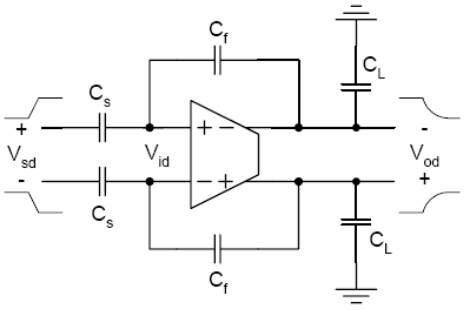
" Problems I face "

Project : fully differential OTA for a switched capacitor circuit application

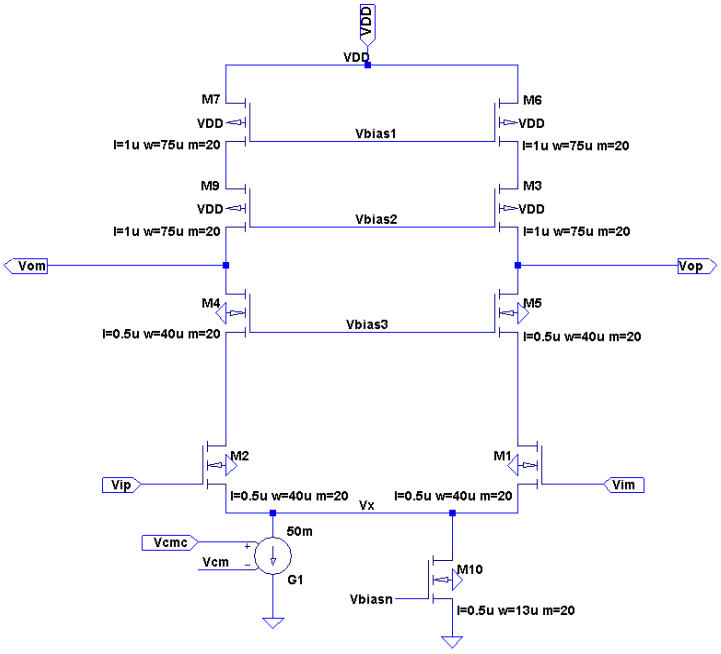


SPECS

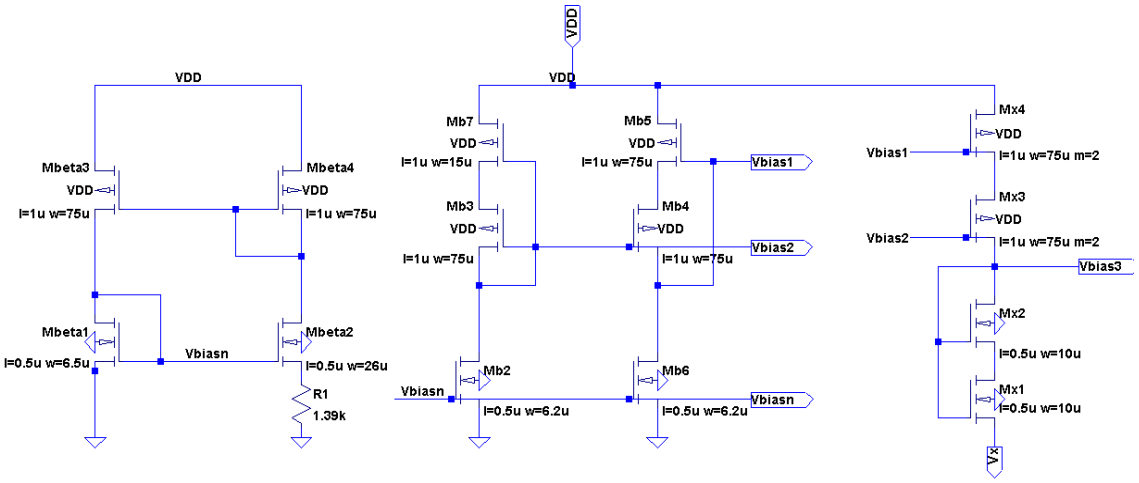
	3V
CL	>= 2pF
Cs	>= 4pF
Cf	0.5Cs
DR	86 dB
Settling time	<= 10ns
Static settling error	<= 0.1%
Dynamic Settling Error	<= 0.05%

My Design using LTspice

(1) With ideal CMFB:



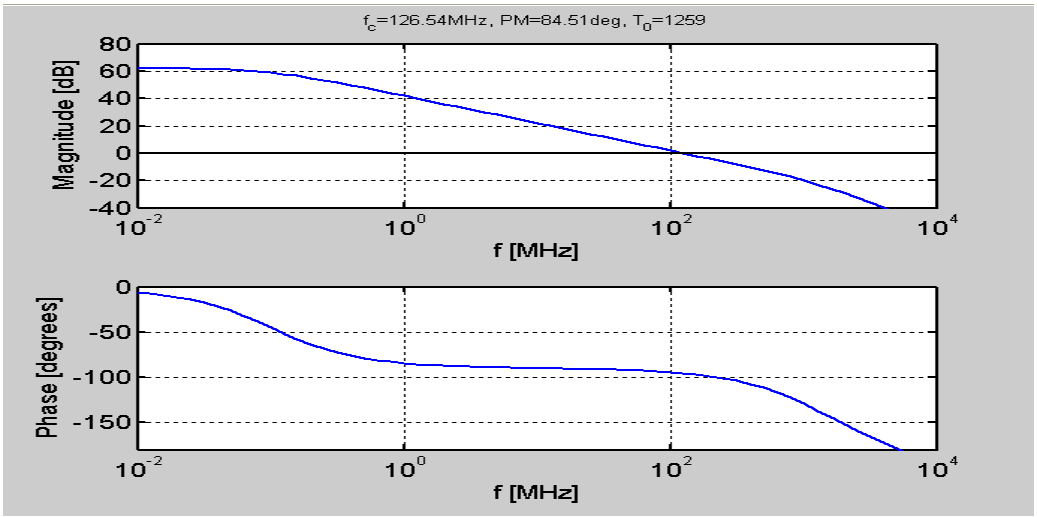
Bias Cell



Ideal CMFB Results

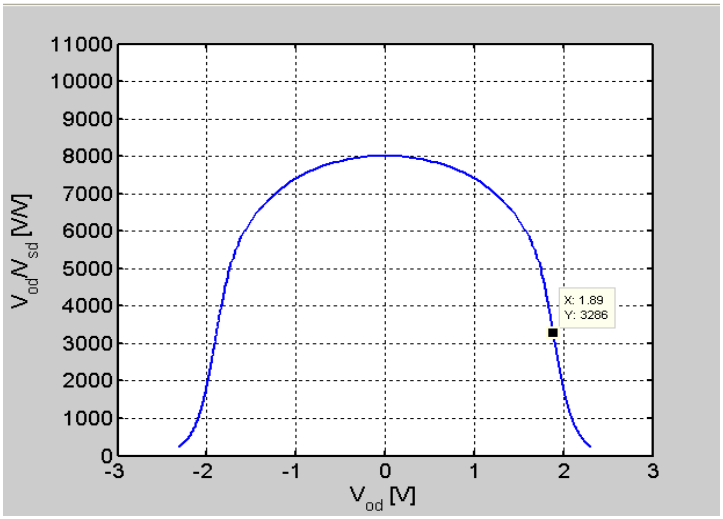
Stability Check

Fc required for ts to be less than 10ns is about 120MHz And To about 1000

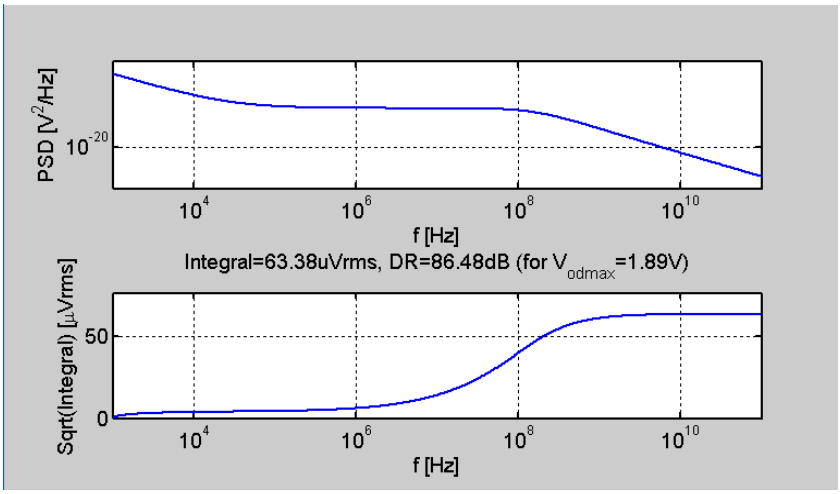


Gain + Swing

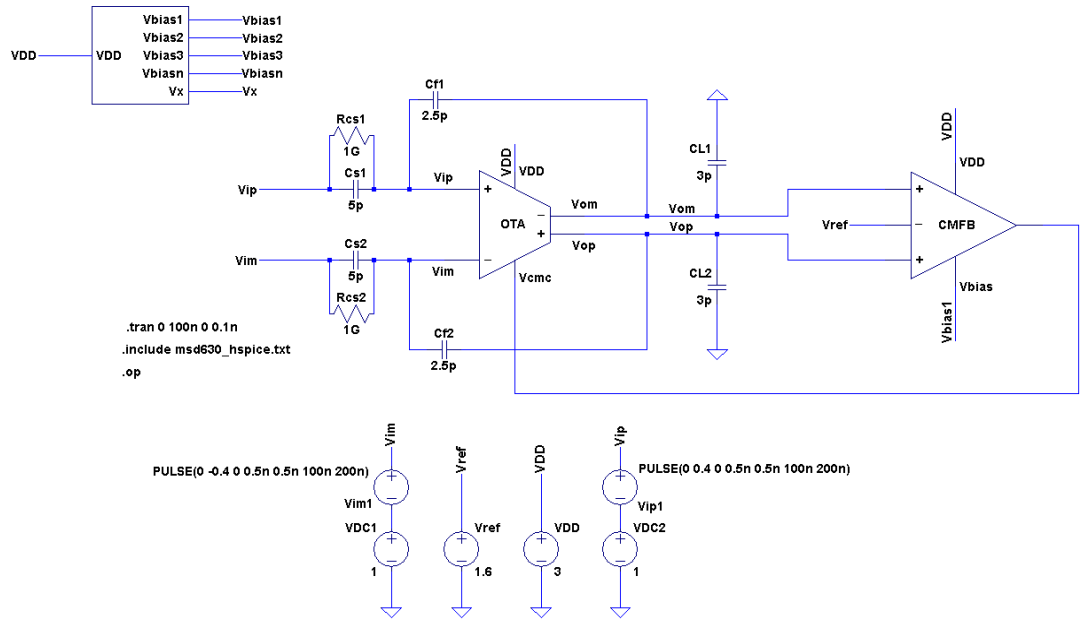
Required gain for the static error is calculated to be >= 3200



Noise + DR



(2) With CMFB Realized in 2 different topologies



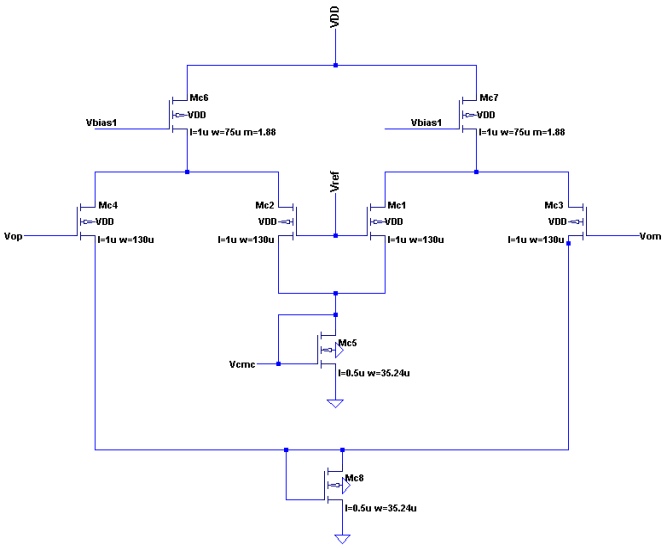
Bias Cell

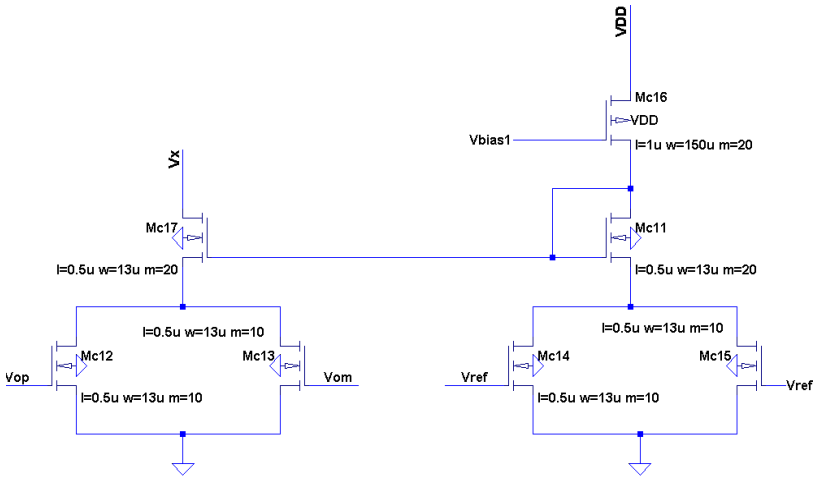
The same as before

OTA

The same as before

CMFB is realized in 2 different topologies





These topologies deteriorate the output swing as they are sensitive to the differential outputs as well

Any suggestions ?!

Also these CMFBs almost double the current (consume the same amount of the current used in the OTA)