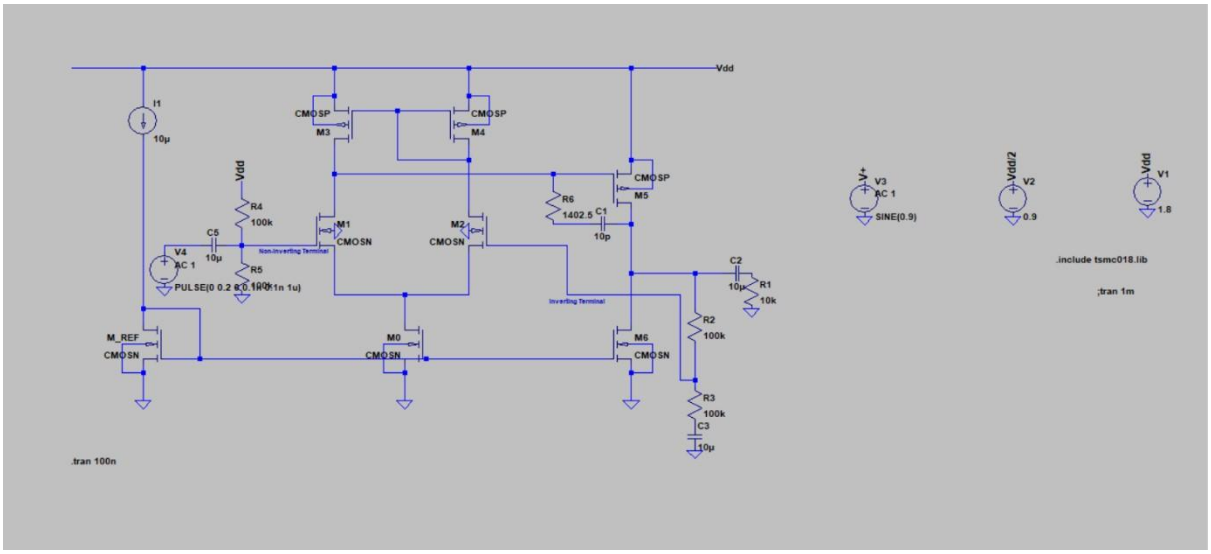
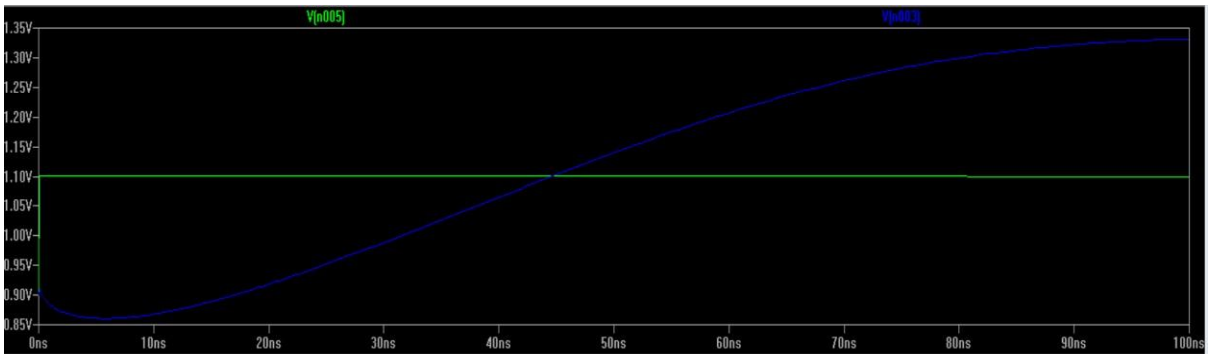
2-Stage OTA Design

Name: T Nikhilesh Reddy



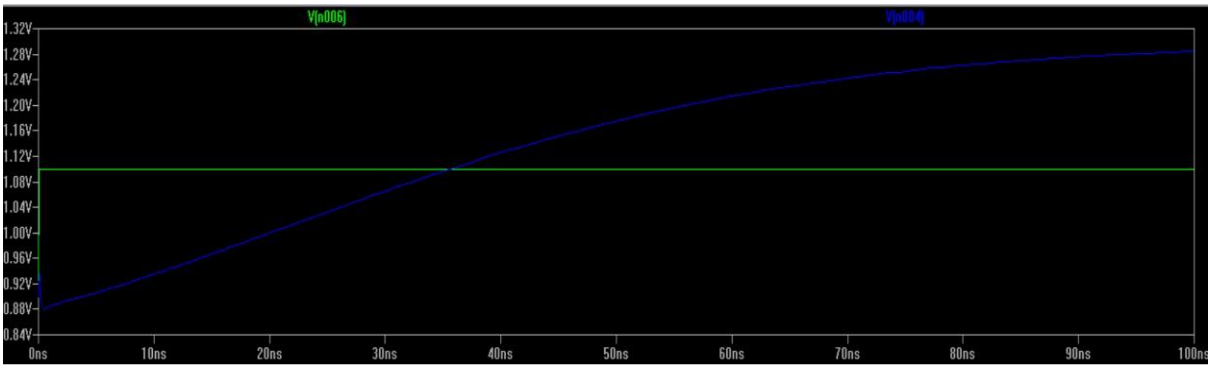
Schematic for step response

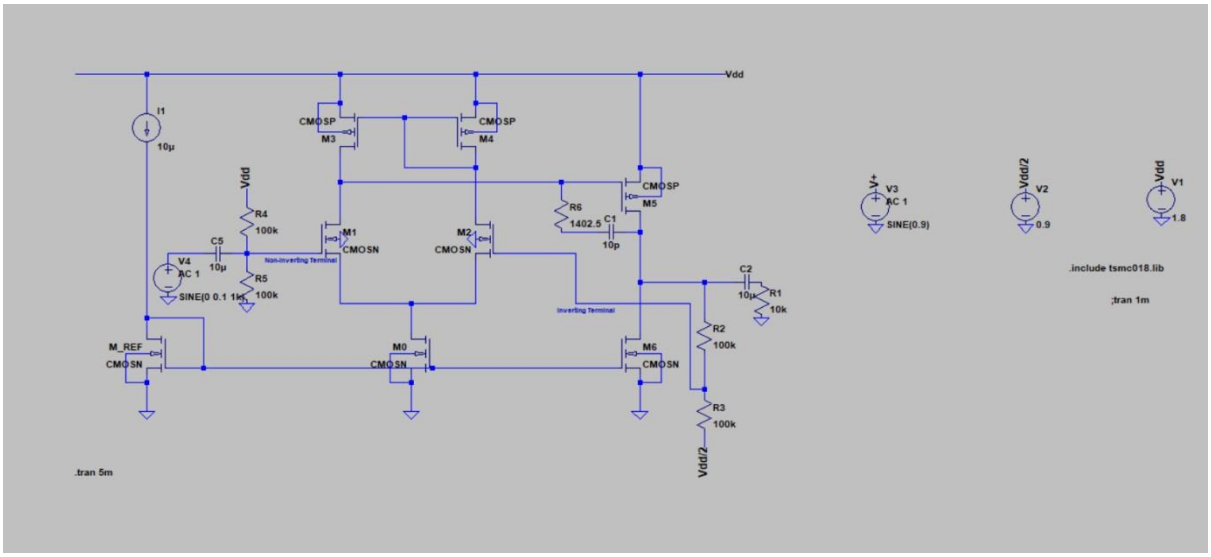
Step response with only miller compensation(C=10pf):



Dip is not desirable so we add a resistor to compensate the RHP zero.
R=1/gm = 1402.5ohm.

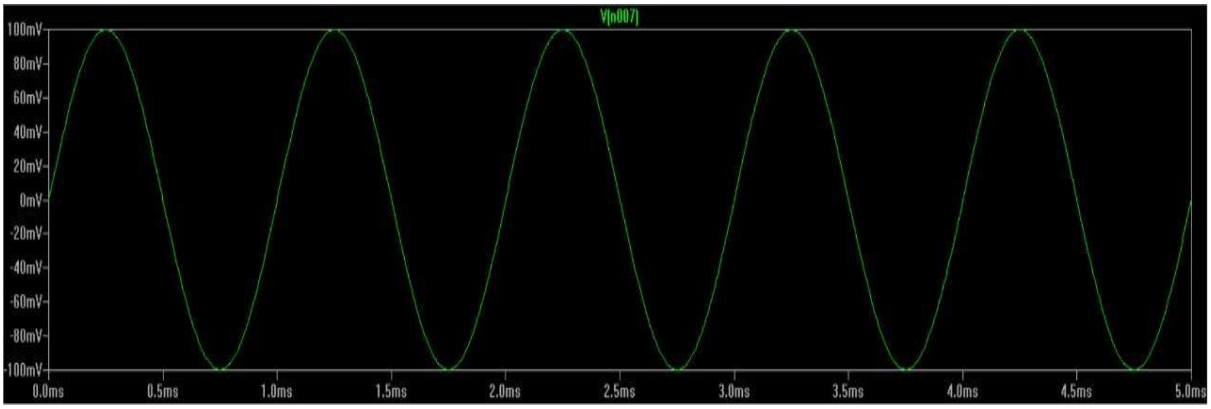
Final Step Response:



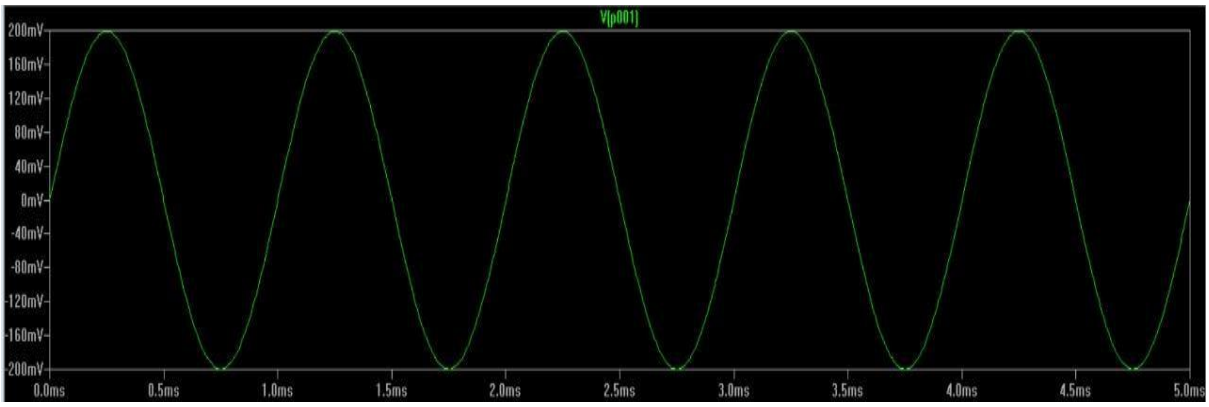


Schematic for Sine input

Input Signal:

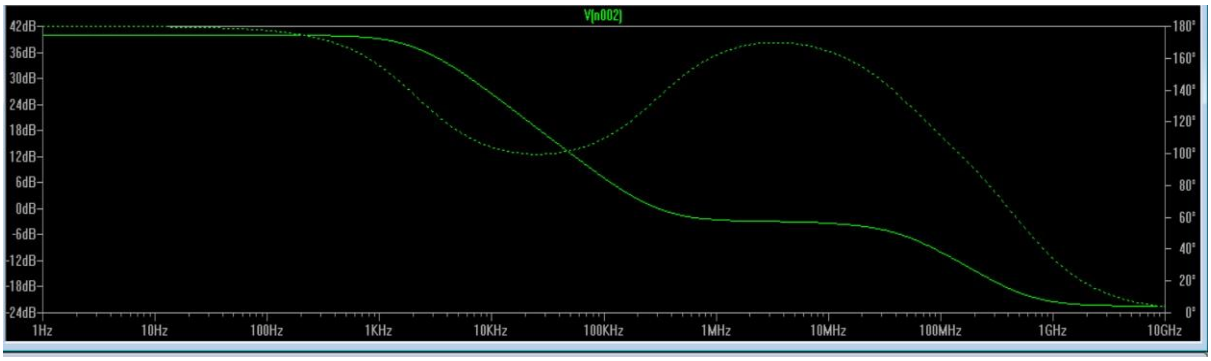


Output Signal :

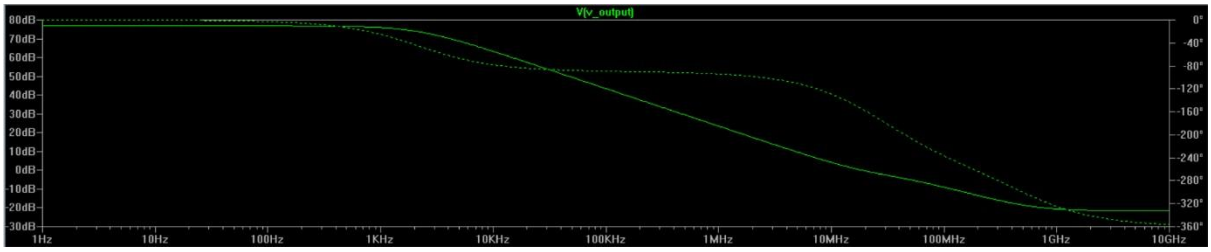


Here we can see AC gain = 2.

DC Gain plots:



DC Gain for 1st stage=40dB.



DC Gain after 2nd stage=77dB.

DC Operating point of Open Loop:

Name:	m5	m4	m3	m6	m_ref
Model:	cmosp	cmosp	cmosp	cmosn	cmosn
Id:	-9.95e-05	-4.84e-05	-4.84e-05	9.95e-05	1.00e-05
Vgs:	-6.67e-01	-6.67e-01	-6.67e-01	5.91e-01	5.91e-01
Vds:	-1.25e+00	-6.67e-01	-6.67e-01	5.48e-01	5.91e-01
Vbs:	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Vth:	-4.03e-01	-4.05e-01	-4.05e-01	3.88e-01	3.87e-01
Vdsat:	-2.08e-01	-2.07e-01	-2.07e-01	1.56e-01	1.56e-01
Gm:	7.13e-04	3.50e-04	3.50e-04	9.79e-04	9.82e-05
Gds:	4.53e-06	2.54e-06	2.54e-06	5.68e-06	5.47e-07
Gmb	2.26e-04	1.11e-04	1.11e-04	2.72e-04	2.73e-05
Cbd:	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cbs:	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cgsov:	6.03e-14	3.02e-14	3.02e-14	3.40e-14	3.40e-15
Cgdov:	6.03e-14	3.02e-14	3.02e-14	3.40e-14	3.40e-15
Cgbov:	1.84e-18	1.84e-18	1.84e-18	1.87e-18	1.87e-18
dQgdVgb:	1.33e-12	6.64e-13	6.64e-13	6.04e-13	6.04e-14
dQgdVdb:	-5.80e-14	-2.93e-14	-2.93e-14	-3.32e-14	-3.31e-15
dQgdVsb:	-1.23e-12	-6.16e-13	-6.16e-13	-5.36e-13	-5.37e-14
dQddVgb:	-5.51e-13	-2.76e-13	-2.76e-13	-2.50e-13	-2.50e-14
dQddVdb:	5.90e-14	2.98e-14	2.98e-14	3.36e-14	3.36e-15
dQddVsb:	6.50e-13	3.25e-13	3.25e-13	2.85e-13	2.85e-14
dQbdVgb:	-2.25e-13	-1.12e-13	-1.12e-13	-1.03e-13	-1.04e-14
dQbdVdb:	2.37e-16	-1.12e-16	-1.12e-16	-1.26e-16	-5.99e-18
dQbdVsb:	-1.29e-13	-6.46e-14	-6.46e-14	-6.81e-14	-6.75e-15

Name:	m0	m1	m2
Model:	cmosn	cmosn	cmosn
Id:	9.68e-05	4.84e-05	4.84e-05
Vgs:	5.91e-01	6.52e-01	6.52e-01
Vds:	2.48e-01	8.85e-01	8.85e-01
Vbs:	0.00e+00	-2.48e-01	-2.48e-01
Vth:	3.89e-01	4.60e-01	4.60e-01
Vdsat:	1.55e-01	1.57e-01	1.57e-01
Gm:	9.47e-04	4.90e-04	4.90e-04
Gds:	2.18e-05	2.37e-06	2.37e-06
Gmb	2.64e-04	1.24e-04	1.24e-04
Cbd:	0.00e+00	0.00e+00	0.00e+00
Cbs:	0.00e+00	0.00e+00	0.00e+00
Cgsov:	3.40e-14	1.70e-14	1.70e-14
Cgdov:	3.40e-14	1.70e-14	1.70e-14
Cgbov:	1.87e-18	1.87e-18	1.87e-18
dQgdVgb:	6.08e-13	2.98e-13	2.98e-13
dQgdVdb:	-3.87e-14	-1.64e-14	-1.64e-14
dQgdVsb:	-5.37e-13	-2.65e-13	-2.65e-13
dQddVgb:	-2.55e-13	-1.25e-13	-1.25e-13
dQddVdb:	3.88e-14	1.67e-14	1.67e-14
dQddVsb:	2.86e-13	1.38e-13	1.38e-13
dQbdVgb:	-9.89e-14	-4.83e-14	-4.83e-14
dQbdVdb:	-4.85e-15	4.69e-17	4.69e-17
dQbdVsb:	-6.90e-14	-2.83e-14	-2.83e-14