v_dd

voutcm

I1
20u

E3
0.5

E1
0.5

xota1

vincm

vinp
ota-diff
vinn

voutn

voutp

voutcmn

voutcmp

GND

C4
100f
m=1
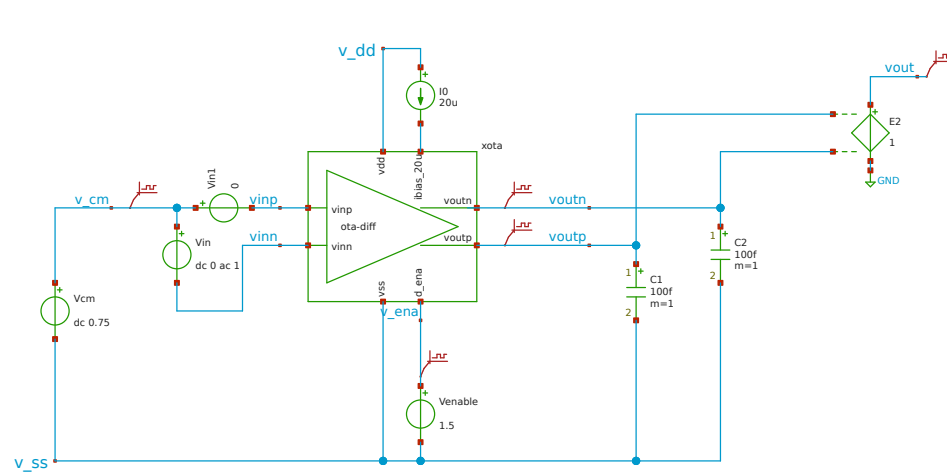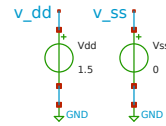
C3
100f
m=1

Vcm1
dc 0.75 ac 1

v_ena

v_ss

NGSPICE

```
.temp 27
.include ota-diff_tb-acol.save
.control
option sparse
set filetype=ascii
save all

op
write ota-diff_tb-acol.raw
set appendwrite

ac dec 101 1k 10G
write ota-diff_tb-acol.raw
plot 20*log10(vout)
plot cph(vout)*180/pi
plot 20*log10(voutcm)
plot cph(voutcm)*180/pi

.endc
```

v_dd

v_ss

Vdd
1.5

Vss
0

GND

GND

v_dd

vout

I0
20u

E2
1

xota

v_cm

Vin1
0

vinp

vinp
ota-diff
vinn

voutn

voutp

voutn

GND

voutp

Vin
dc 0 ac 1

vinn

C2
100f
m=1

C1
100f
m=1

Vcm
dc 0.75

v_ena

Venable
1.5

v_ss

MODEL

```
.lib cornerMOSlv.lib mos_tt
.lib cornerRES.lib res_typ
.lib cornerCAP.lib cap_typ
```

simulate   annotate OP

XSCHEM