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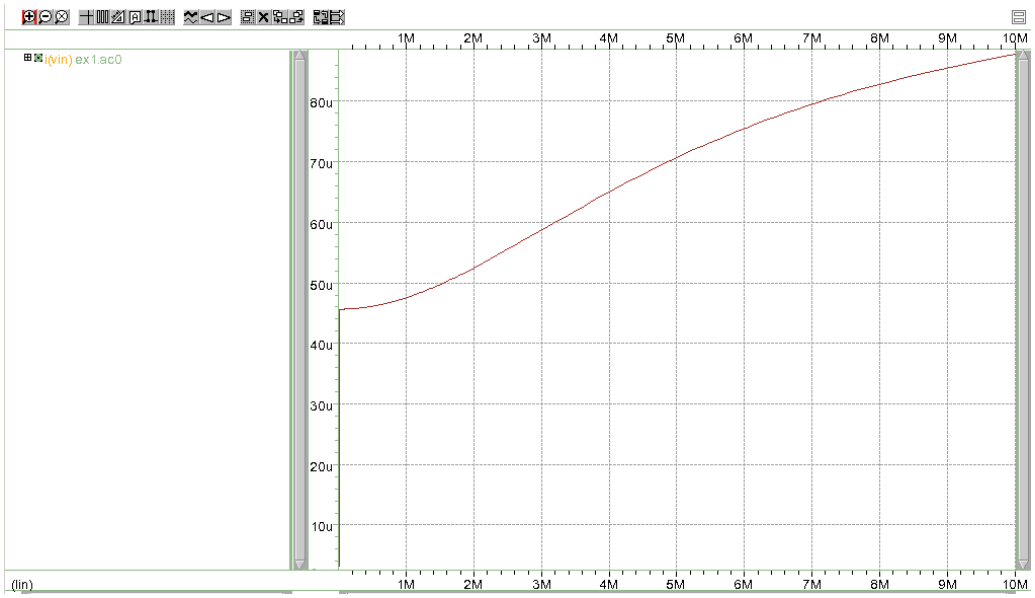
Prelab #7

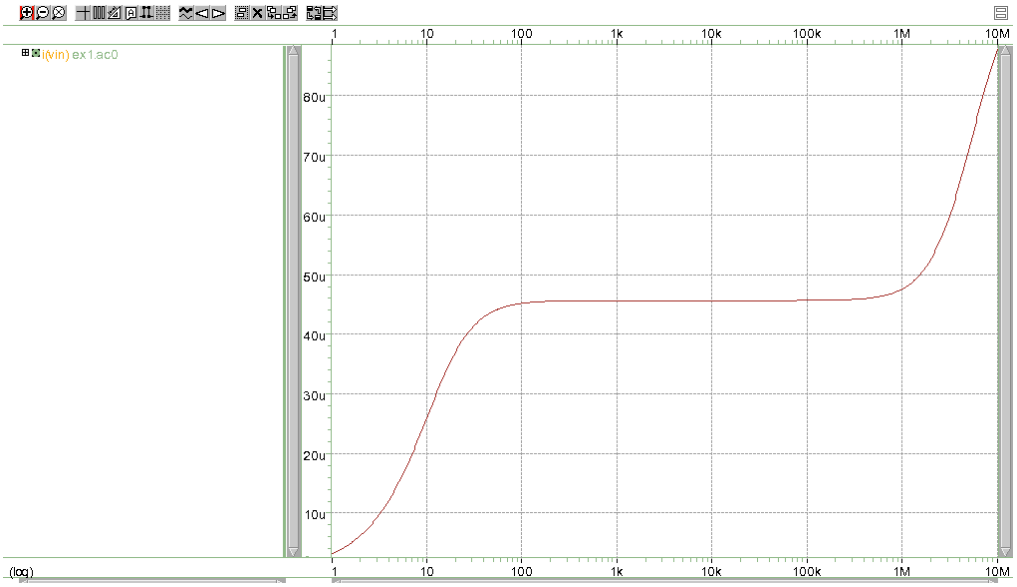
Exercise 1

ex1.sp

```
Exercise 1
.opt post
.MODEL nmos2N7000   NMOS (LEVEL=3   RS=0.205          NSUB=1.0E15
+DELTA=0.1      KAPPA=0.0506    TPG=1               CGDO=3.1716E-9
+RD=0.239       VTO=1.000       VMAX=1.0E7          ETA=0.0223089
+NFS=6.6E10     TOX=1.0E-7      LD=1.698E-9         UO=862.425
+XJ=6.4666E-7   THETA=1.0E-5    CGSO=9.09E-9)

Vdd 1 0 10V
Rb1 2 0 10k
Rss 5 0 500
Rd 3 1 18.94k
m1 3 2 5 0 nmos2N7000 W = 0.8E-2 L=2.5E-6
C1 2 0 10uF
C2 3 0 10uF

.probe
.plotI(m1)
.end
```



It hits cutoff and the curve can be seen getting flat in saturation.

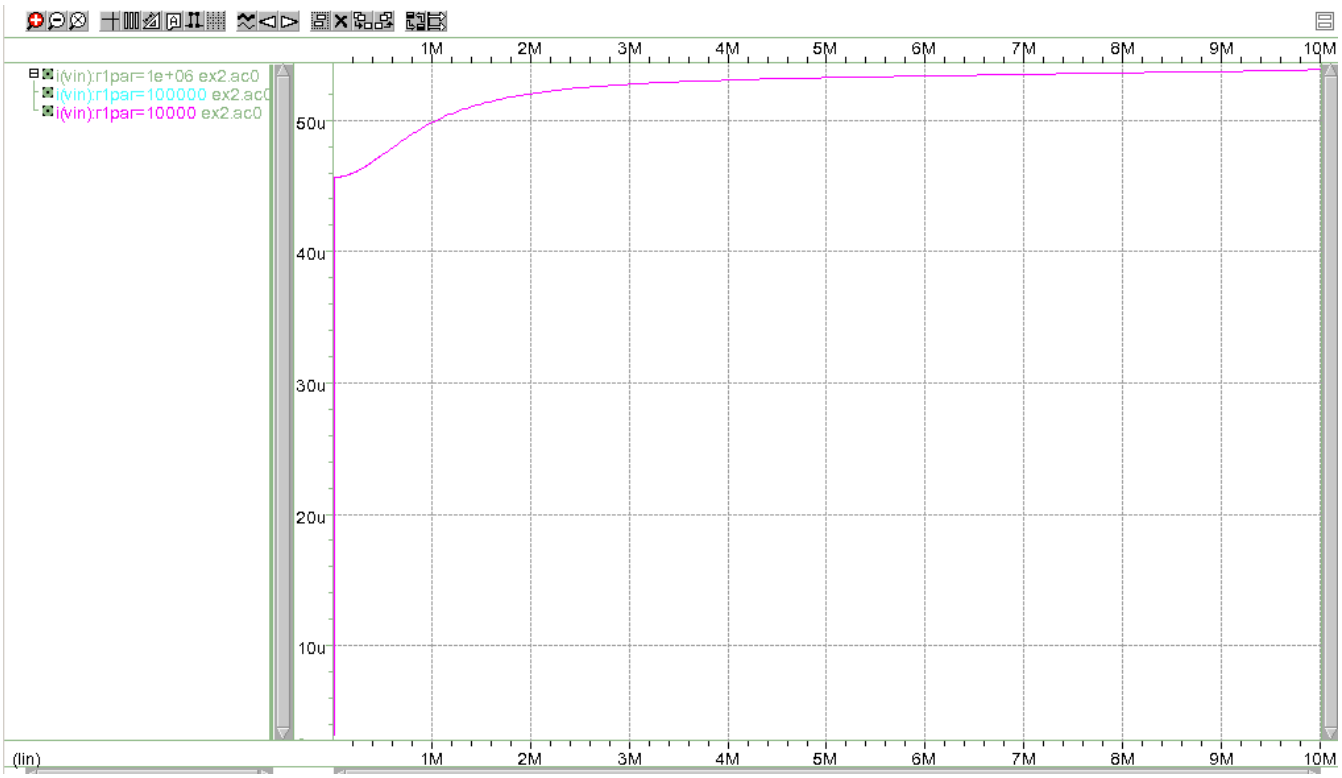


The second graph shows that it stays in cutoff until it reaches a threshold.

Exercise 2

ex2.sp | ex1.sp | ex1.sp

```
Exercise 2
.opt post

.MODEL nmos2N7000   NMOS (LEVEL=3   RS=0.205          NSUB=1.0E15
+DELTA=0.1      KAPPA=0.0506    TPG=1               CGDO=3.1716E-9
+RD=0.239       VTO=1.000       VMAX=1.0E7          ETA=0.0223089
+NFS=6.6E10     TOX=1.0E-7      LD=1.698E-9         UO=862.425
+XJ=6.4666E-7   THETA=1.0E-5    CGSO=9.09E-9)

Rb1 vdd gate 10k
Rb2 gate 0 1.23k
Rss source 0 500
RL out 0 rLpar
Rd vdd drain 18.94k
m1 drain gate soure  source nmos2N7000 W = 0.8E-2 L=2.5E-6
C1 in gate 10u
C2 drain out 10u

.param rLpar = 1e6
.param rLpar = 100k
.param rLpar = 10k

vdd vdd 0 10V
vin in 0 AC(50mV 0)

.temp=27

.probe ac gaindB=par('20*log10(v(out))')
.plot v(out)
.ac dec 100 1 1e7 sweep r1par poi 3 1e6 100k 10k
.op

.end
```


I(vin):r1par=1e+06 ex2.ac0
I(vin):r1par=100000 ex2.ac0
I(vin):r1par=10000 ex2.ac0
1M
2M
3M
4M
5M
6M
7M
8M
9M
10M
50u
40u
30u
20u
10u
(lin)