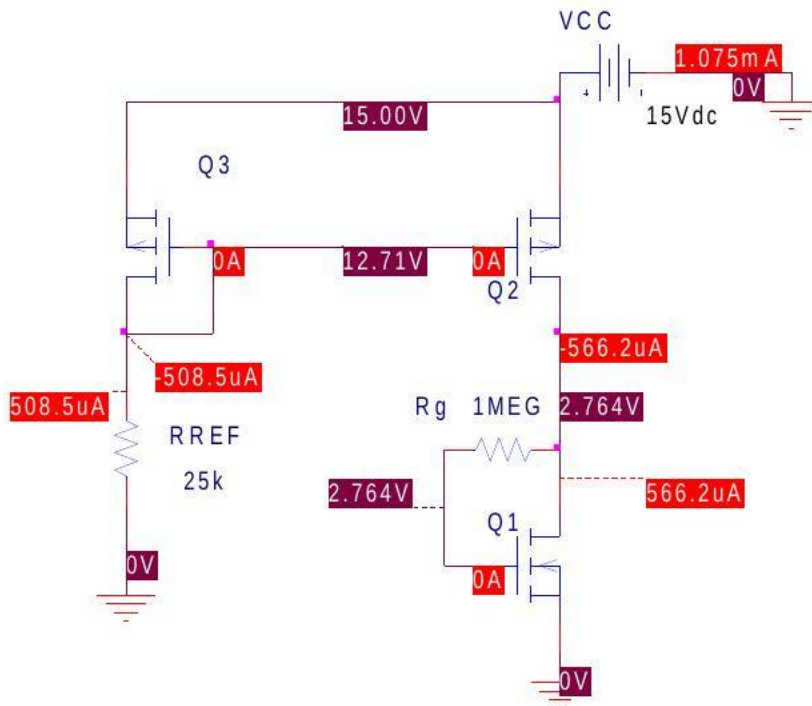


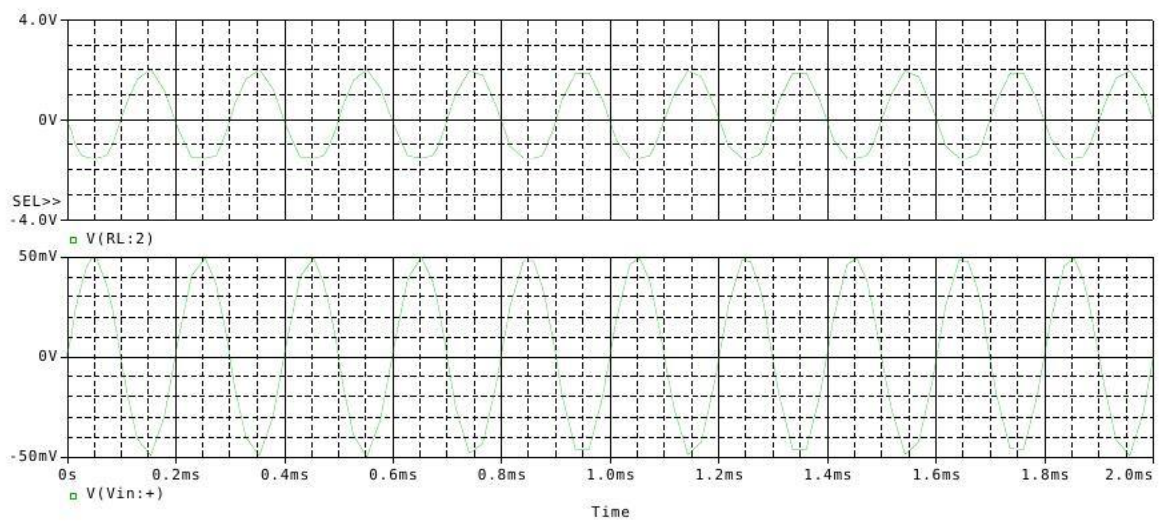
6.

a. b.

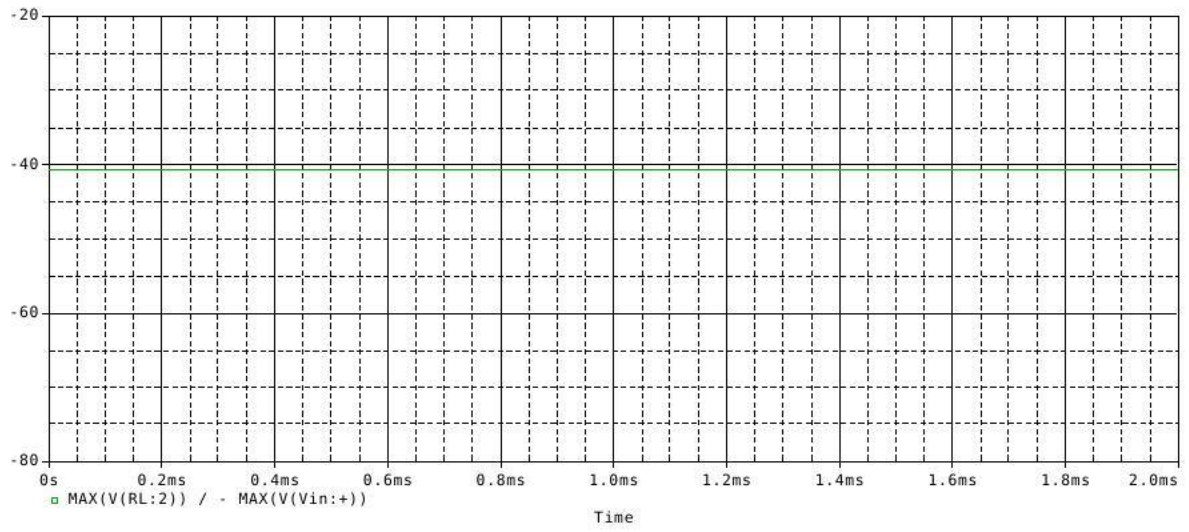


$V_{GS} > V_{th}$ ve $V_{DS} < V_{GS} - V_{th} \wedge \wedge Q_3$ ve $Q_2 \rightarrow$ "Triode Region" (Linear Region).
 $V_{GS} > V_{th}$ ve $V_{DS} > V_{GS} - V_{th} \wedge \wedge Q_1 \rightarrow$ "Saturation Region".

c. Input & Output Voltages

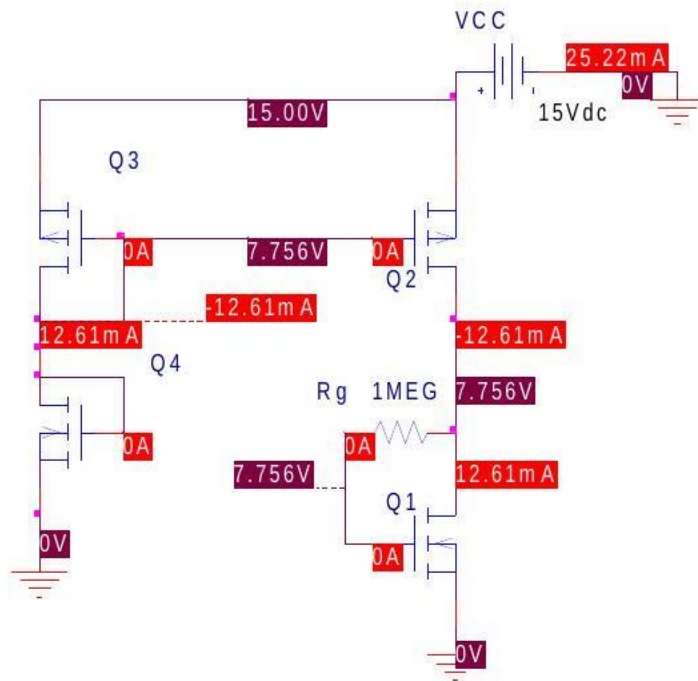


Voltage Gain



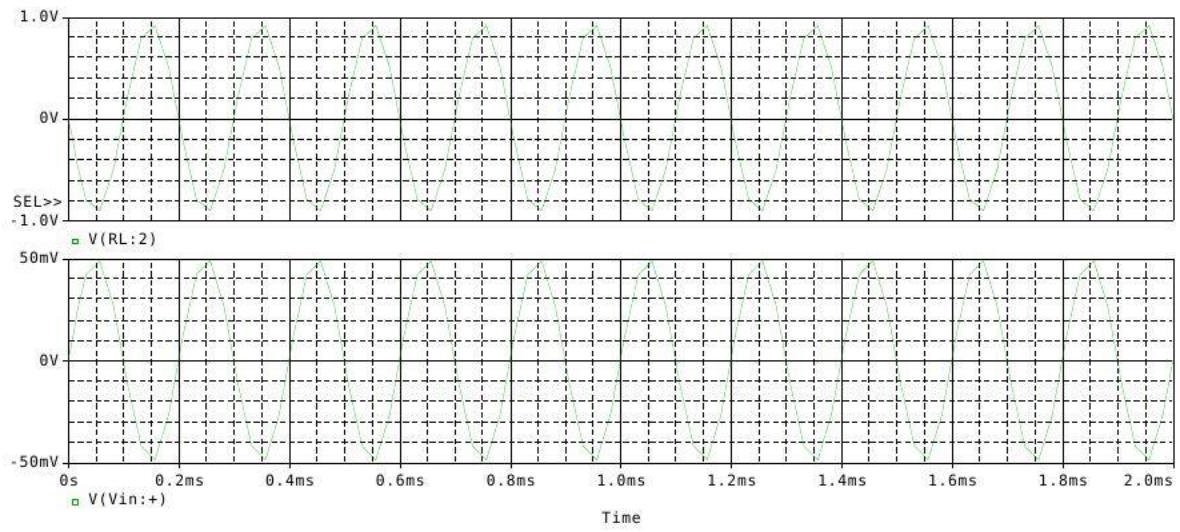
Gain = **-41,456**

d. R_{REF} yerine NMOS koyarsak;

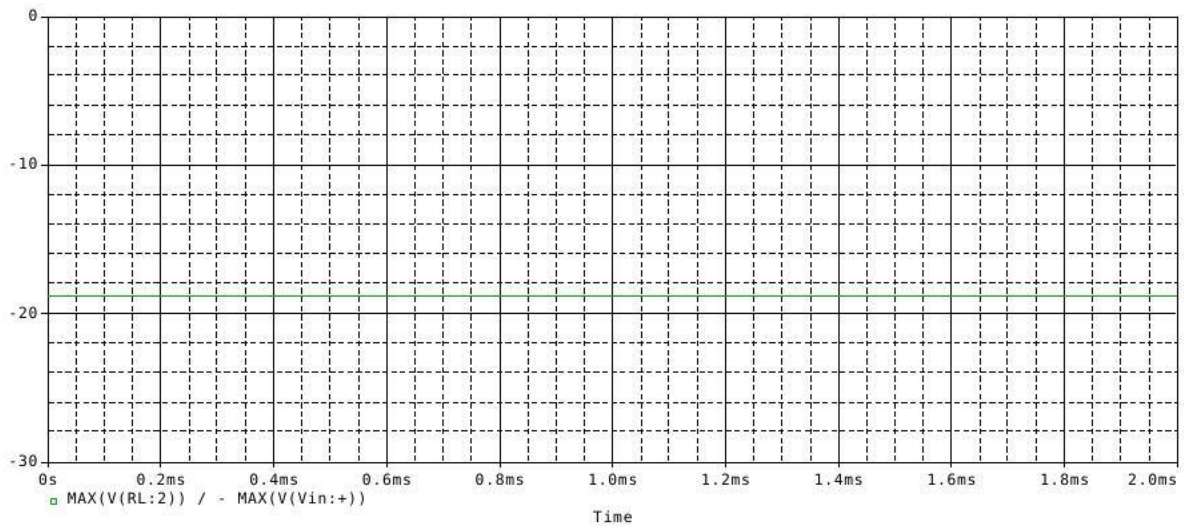


$Q_2, Q_3, Q_4 \rightarrow$ "Triode Region" (Linear Region)
 $Q_1 \rightarrow$ "Saturation Region"

Input & Output Voltages



Voltage Gain



$$\text{Gain} = -19.632$$

e. R_{REF} ve NMOS değışikliğini yaptığımızda kazanç değerlerinde artış gözlemledik.

f.

$R_{REF} = 25 \text{ k}\Omega$ için

	Q_1	Q_2	Q_3
I_D	0.566 mA	0.566 mA	0.509 mA
V_{DS}	2.764 V	-12.236 V	-2.29 V
Gain = - 41,456			

NMOS için

	Q_1	Q_2	Q_3
I_D	12.61 mA	12.61 mA	12.61 mA
V_{DS}	7.756 V	-7.244 V	-7.244 V
Gain = -19.632.			