EDC Assignment 4

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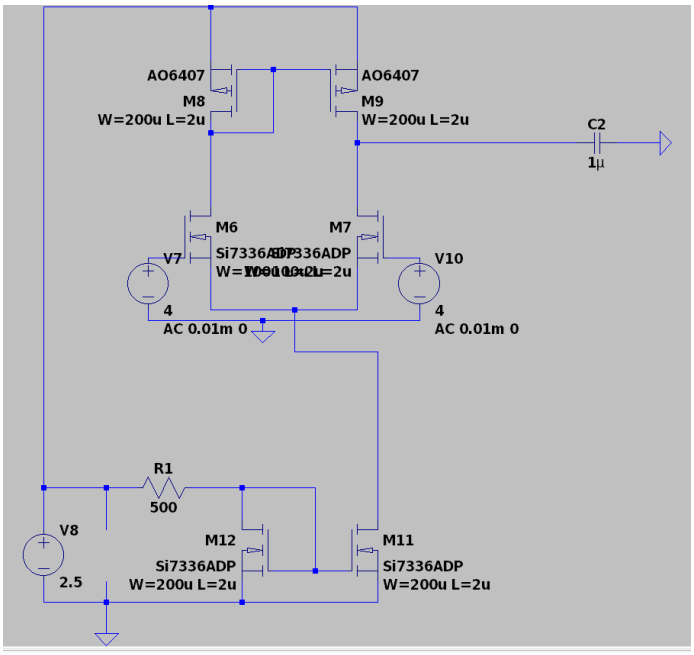
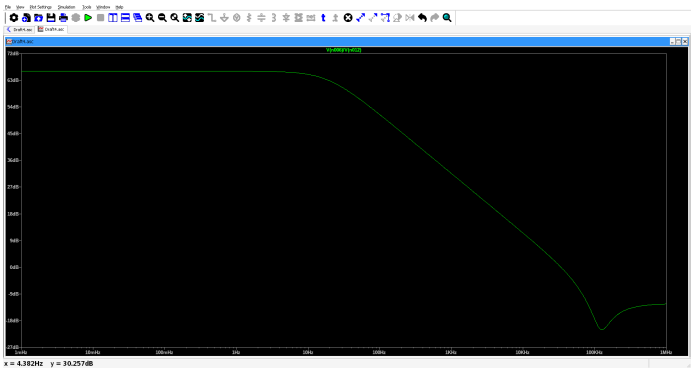
The circuit is the following,



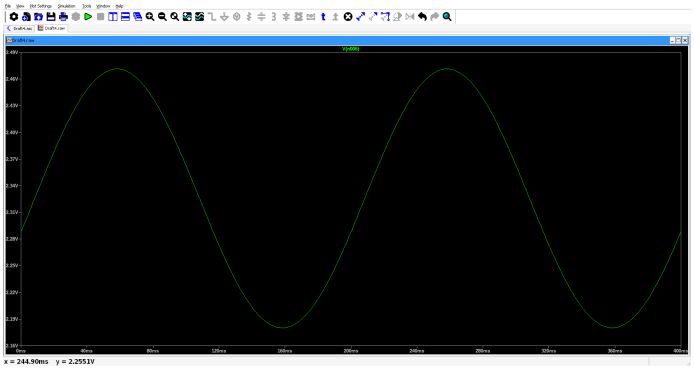
0.1 Small Signal Differential Gain

In simulation,

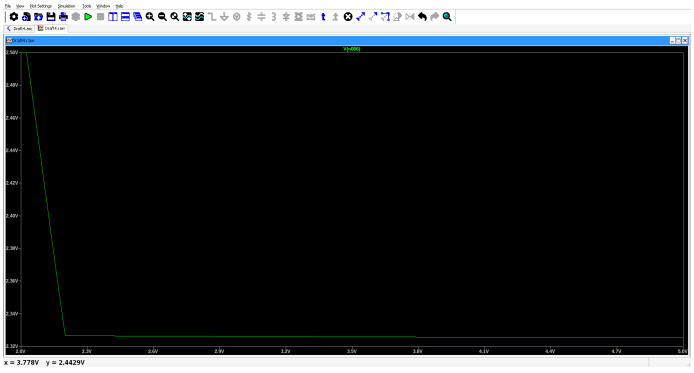
At frequency of $200mHz$ with an AC amplitude of $75\mu V$
$common\ gain = 431\mu$
$differential\ gain = 1.75k$
$CMRR = 72.3dB$
$r_o = 796k\Omega$
$g_m = 2.43m\Omega^{-1}$
Input offset voltage = 2.32V
Frequency response,



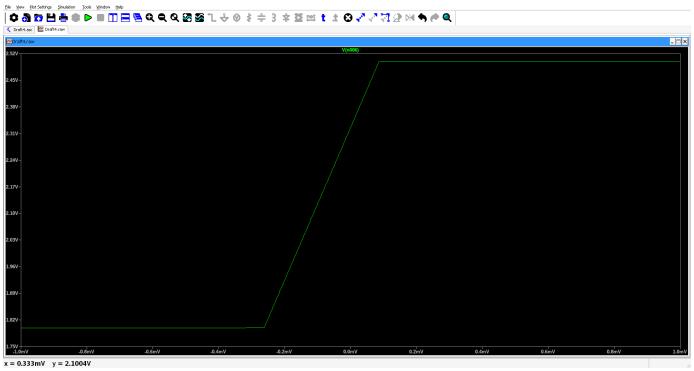
V_{out} for $V_{comm} = 4$ and $V_{diff} = 75\mu V$ sinusoid of frequency $5Hz$,



Common Mode DC Sweep,



Differential Mode DC Sweep,



Theoretical Calculations for gain,
differential gain $= g_m(r_{o_n}||r_{o_p})$
$r_{o_n} = \frac{1}{\lambda I_D} = 434.8k\Omega$ $r_{o_p} = \infty$ as $\lambda = 0$
Thus,
$gain = 1k$