# ECEN405 Lab 1

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## I. Deliverables

### A. 1)

$$
\begin{aligned}
30k &= \frac{10k}{32.8k(1k)C_1} \\
30k &= \frac{10k}{32.8M\ C_1} \\
\frac{1}{C_1} &= \frac{30k \cdot 32.8M}{10k} \\
C_1 &= \frac{10k}{30k \cdot 32.8M} \\
C_1 &= 10.1626nF \\
C_1 &\approx 10nF
\end{aligned}
$$

### B. 2)

In order to find the minimum frequency, $R_3$ needs to be minimized and $R_4$ needs to be maximized. By entering the formula into desmos and assigning $R_3$ to be the X axis and $R_4$ an adjustable slider, the entire range of frequencies can be investigated.

Fig. 1. Minimum frequency at $R_3 = 0\Omega$ and $R_4 = 100k\Omega$

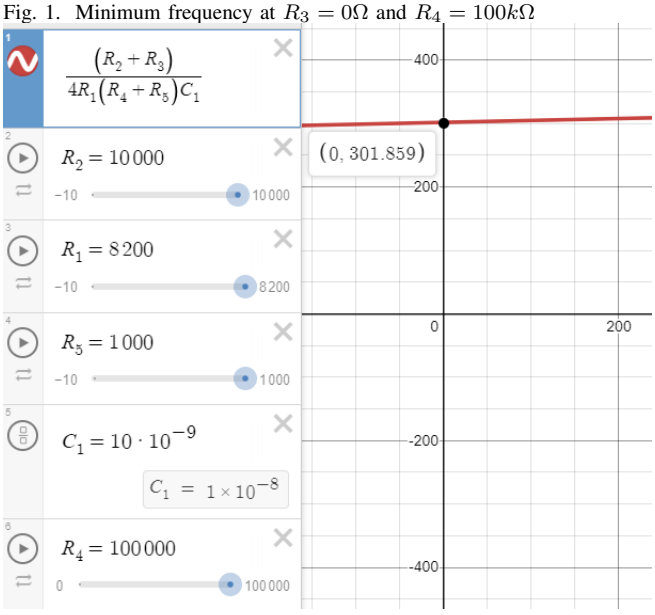
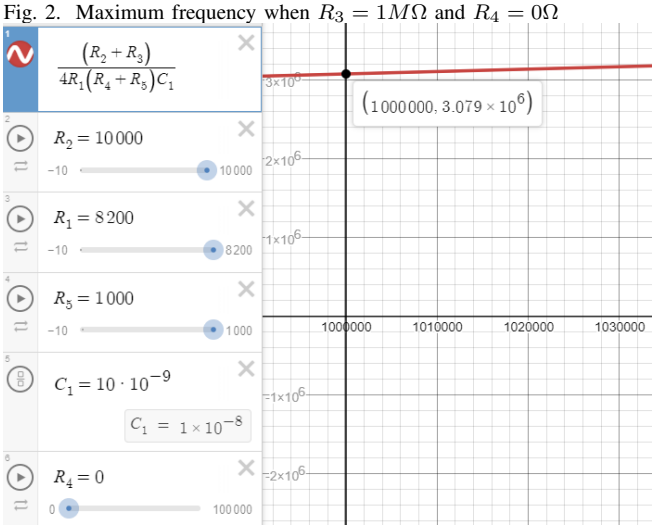



Fig. 2. Maximum frequency when $R_3 = 1M\Omega$ and $R_4 = 0\Omega$




These two figures show that the minimum frequency is 301Hz while the max is 3MHz.

### C. 3)

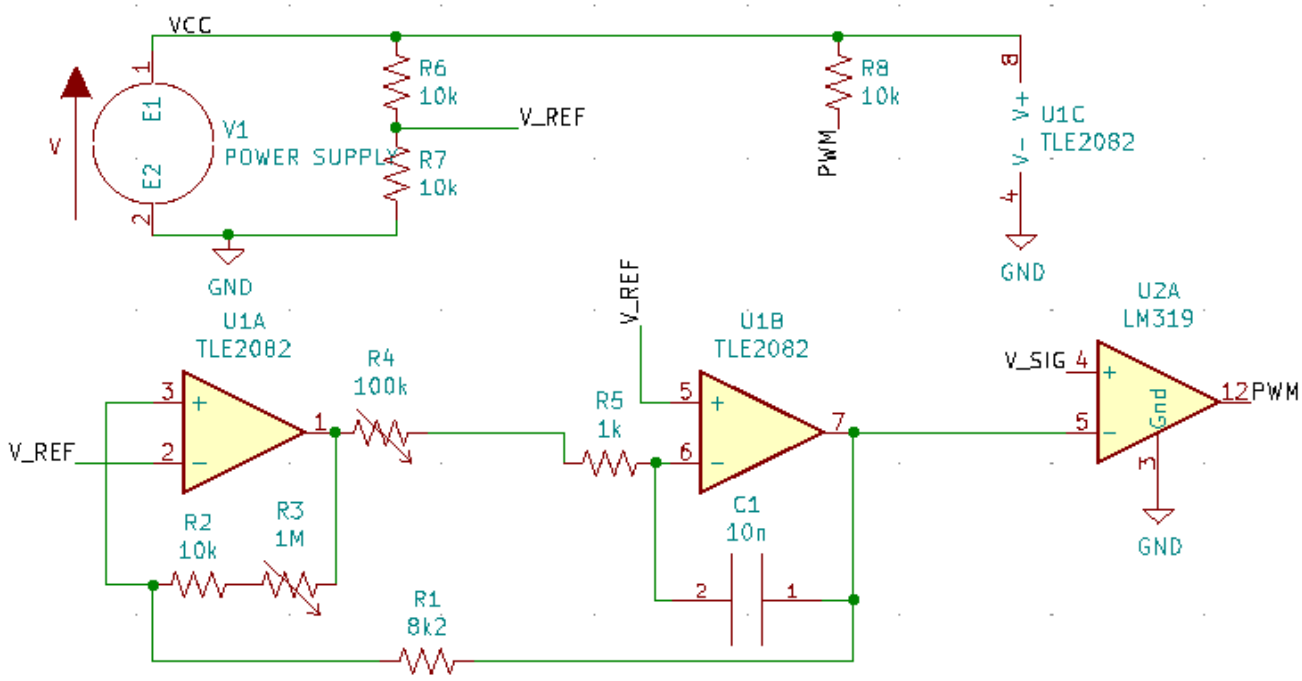



Fig. 3. Schematic of PWM Generator