2CJ4 LAB Report

Set 4

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As a future member of the engineering profession, the student is responsible for performing the required work in an honest manner, without plagiarism and cheating. Submitting this work with my name and student number is a statement and understanding that this work is our own and adheres to the Academic Integrity Policy of McMaster University and the Code of Conduct of the Professional Engineers of Ontario.

i.

Calculations:

$$V_{th1} = \frac{R_3}{R_2 + R_3} \times V_{sat}^{+} = \frac{1k}{22k+1k} \cdot 5V = 0.217V$$

$$V_{th2} = \frac{R_3}{R_2 + R_3} \times V_{sat}^{-} = \frac{1k}{-22k+1k} \cdot 5V = -0.217V$$

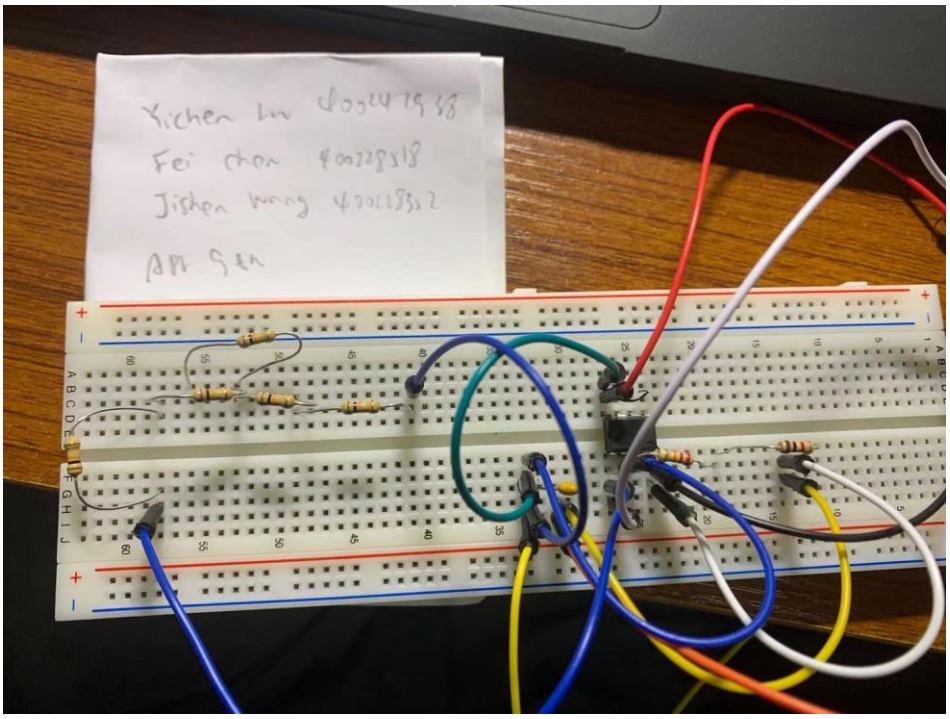
$$T = C_1 \cdot R_1 \cdot \ln\frac{V_{sat}^{+} - V_{th2}}{V_{sat}^{+} - V_{th3}} + C_1 \cdot R_1 \ln\frac{V_{sat}^{-} - V_{th1}}{V_{sat}^{-} - V_{th2}}$$

$$= C_1 \cdot R_1 \times (0.0865 + 0.865) = 0.8685 ms$$

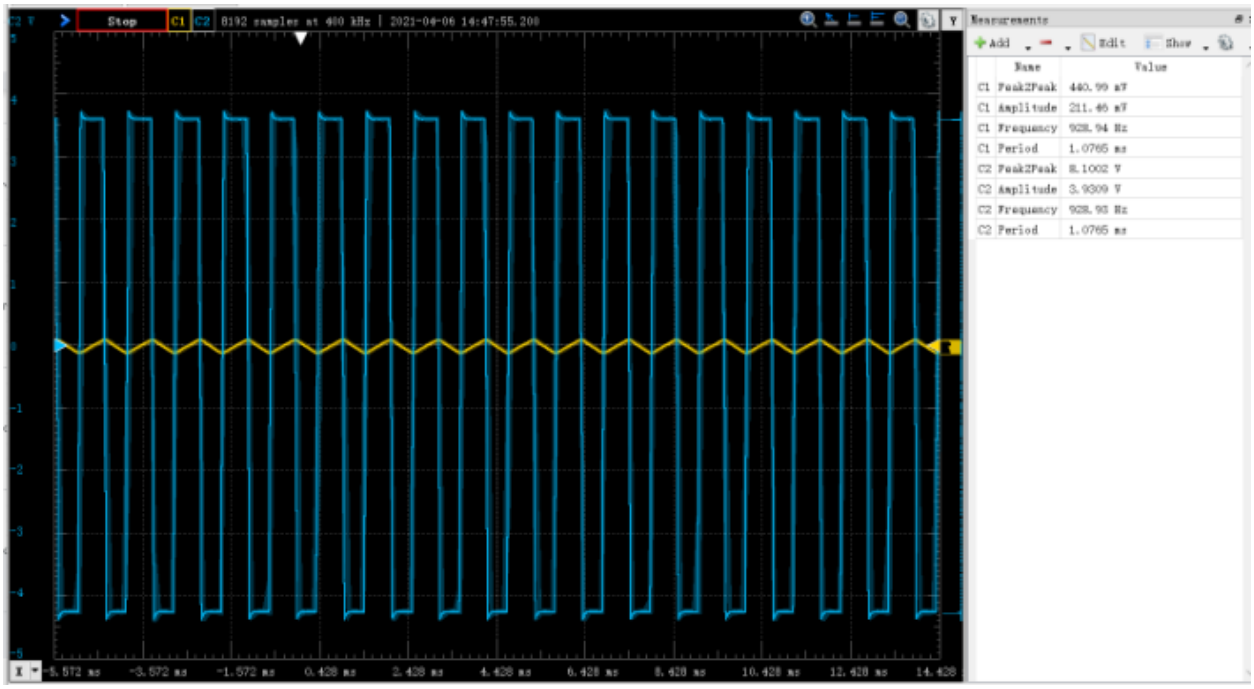
$$f = \frac{1}{T} = 1151.35 Hz$$

ii.

Physical Circuit:



WaveForms Graph:



From the graph, we can get that frequency is 928.93Hz and T(time) is 1076.5us.

iii.

Hence, the experimental and analytical solutions are extremely closed to each other.

In addition, it is possible to get a triangular output because the wave graph can be integrated while having two op-amps. After integrating the square wave graph we would get a triangular wave graph.