EEE 202 CIRCUIT THEORY
LAB 3

Design a circuit that generates the voltage waveform shown in Figure 1. The design should be based on OPAMPs and RC circuits.

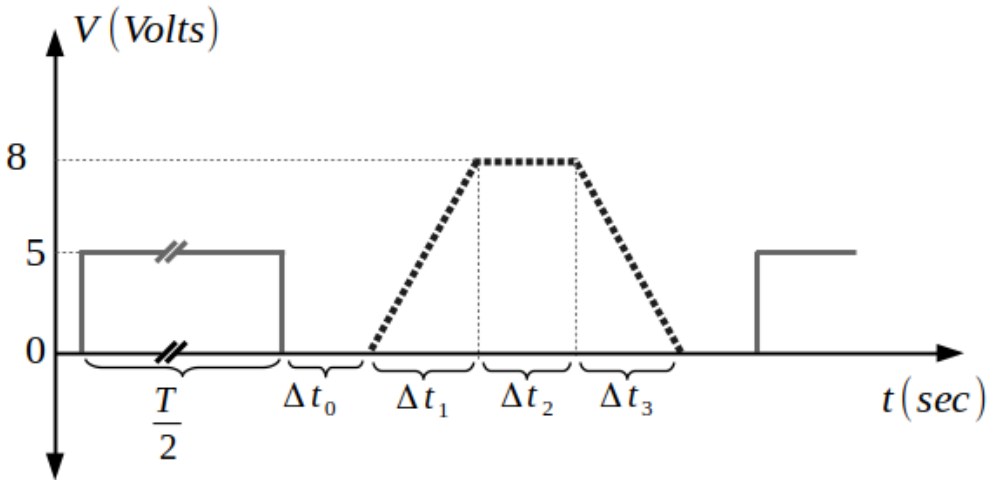

Figure 1: **Input** (solid gray line) is a square pulse. One period of the **output** is shown by dashed lines.

$\Delta t_0 = 2ms, \quad \Delta t_1 = 2ms, \quad \Delta t_2 = 3ms, \quad \Delta t_3 = 2ms$

Input peak voltage: $5V$

Output peak voltage: $8V$

Input frequency: $f < 50Hz, \quad T = \frac{1}{f}$

Software lab

Design a circuit that generates the output in the figure from a square pulse input by using resistors, capacitors and OpAmps. Choose an input frequency less than $50Hz$.

- Use LM324 component library as the OpAmp model in LTspice. It is available on Moodle.
- Derive input/output equations. Explain what you expect mathematically.
- There are important points on x and y axes of Figure 1. Output signal must match those points. Your results must be in a $\pm 10\%$ error bound.

Hardware lab

Build your circuit by using LM324 IC.

- Show your input and output on the same screen.
- Show important intermediate outputs.
- Your results must be in a $\pm 20\%$ error bound.

Checks

1. SW: Explain your circuit and method. Show that your result is in $\pm 10\%$ error bound.
2. HW: Explain your circuit. Show that your result is in $\pm 20\%$ error bound.