



DEPT. Of Computer Science Engineering

SRM IST, Kattankulathur – 603 203

Sub Code & Name: 18CSS201J - ANALOG AND DIGITAL ELECTRONICS

Experiment No	03
Title of Experiment	Design and implement a rectangular waveform generator (OpAmp relaxation oscillator) using a simulation package and demonstrate the working of it
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Date of Experiment	24/08/2020

Mark Split Up

S.No	Description	Maximum Mark	Mark Obtained
1	Oral Viva / Online Quiz	5	
2	Execution	10	
3	Model Calculation / Result Analysis	5	
Total		20	

Staff Signature with date

Design and implement a rectangular waveform generator (Op-Amp relaxation oscillator) using a simulation package and demonstrate the working of it

Aim

To design and implement a rectangular waveform generator (Op-Amp relaxation oscillator) using a simulation package and demonstrate the working of it.

Apparatus Required

S.No	Apparatus	Type	Range	Quantity
1	OP-AMP	IC741		1
2	Resistor		1 k Ω , 1 k Ω , 100 k Ω	Each 1
3	Capacitor		10 nF	1
4	Voltage source		12 V DC	2
5	Voltage probe			1

Software Required

<https://www.multisim.com/>

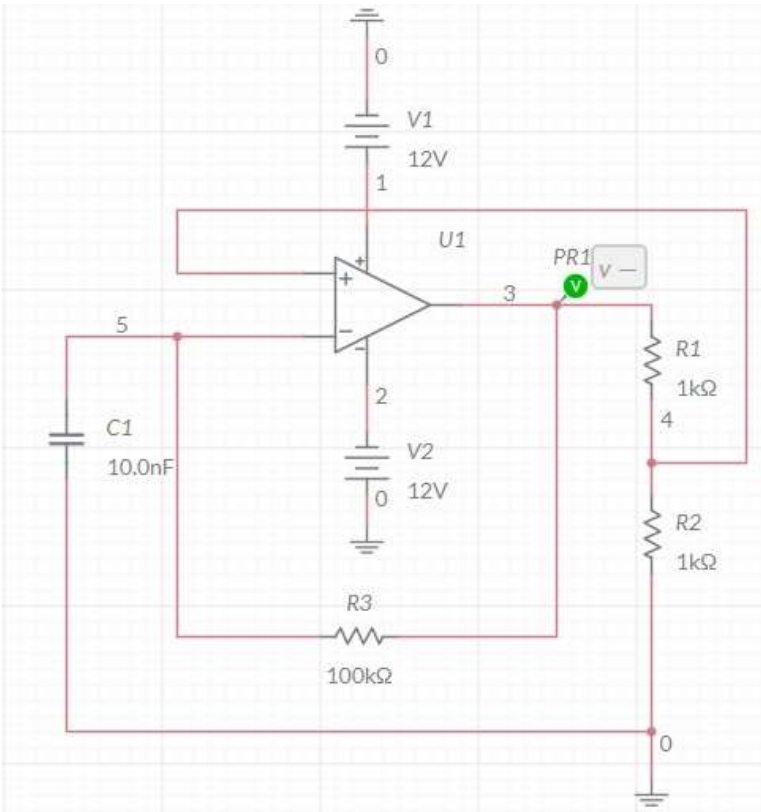
Theory

Rectangular Waves are generated when the Op-Amp is forced to operate in the saturation region. That is, the output of the op-amp is forced to swing respectively between +V_{sat} And -V_{sat} resulting in the generation of square wave. The square wave generator is also called a free-running or astable Multivibrator Assuming the voltage across capacitor C is zero at the instant the d.c Supply voltage at +V_{cc} and V_{EE} are applied. Initially the capacitance C acts, as a short circuit. The gain of the Op-Amp is very large hence V_i drives the output of the Op-Amp to its saturation.

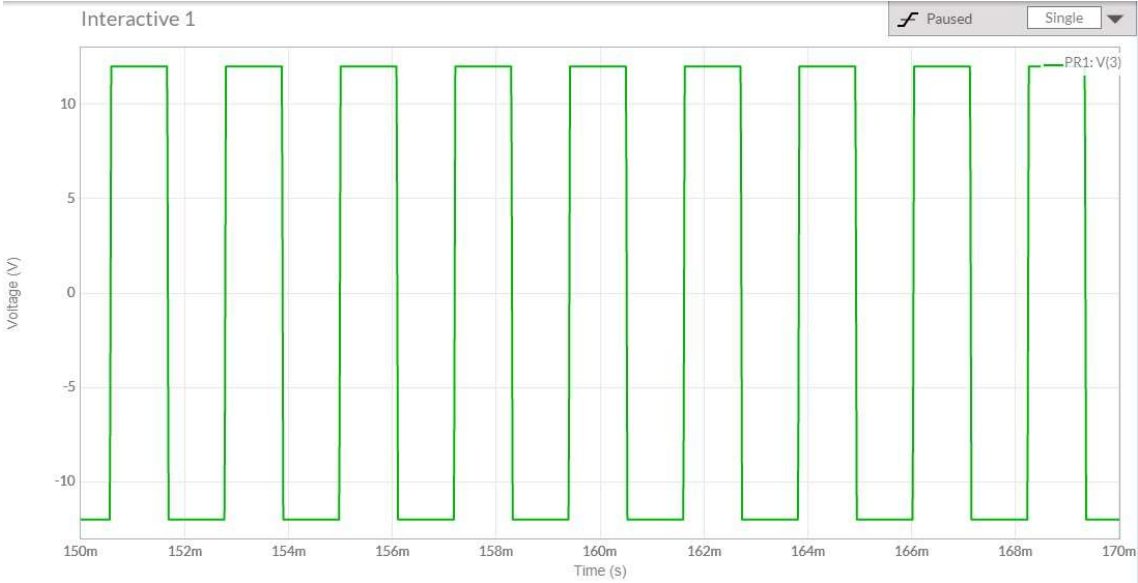
Procedure

- I. Make the connections as per the circuit diagram.
- II. Adjust the values of resistor and capacitor to the desired value.
- III. Measure the output voltage using voltage probe and obtain the graph in grapher window.
- IV. Tabulate the readings.

Circuit Diagram



Model graph



Simulation waveform



Tabulation

Amplitude(V)	Time period (ms)	Frequency (Hz)
12.002	2.12	0.47

Result

Thus, the rectangular wave generator was designed, and the corresponding values are tabulated.