Experiment-05

CSE 350

Group - 01

Section- 1

Submitted By -

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Report

Experiment Name : Analysis of triangular wave Generator.

objective : The objective of this experiment is to analyze a bipolar and unipolar triangular wave generator.

Equipments : (1) Trainers board

(2) 741 opamp

(3) Resistors : 10kΩ - 2units

4kΩ - 1unit

(4) Capacitor - 0.05/0.4μF 1 unit.

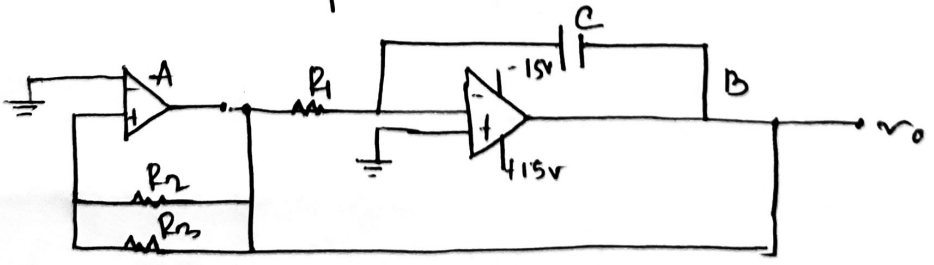
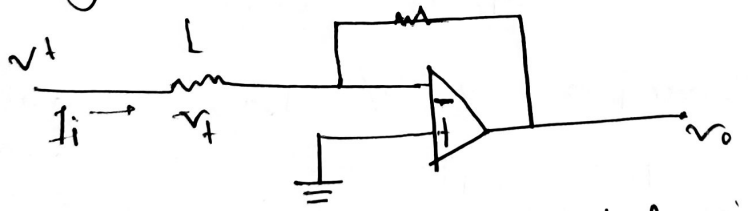


fig: circuit diagram.

Electric current flows through the capacitor through R_1, when A is positive. voltages at both end of the capacitor goes up. when the voltage of the point B falls gradually. The point C. breaks up the voltage difference between A and B. with resistor R_1 and R_2. voltage of point C also goes down as voltage of Point B goes down. when the voltage of point C falls down below zero. the voltage of point A changes into minus. The condition of $R_2 \geq R_3$ is necessary for voltage fall below 0v. Thus, causes current of capacitor) to reverse. The current now flows through the direction of A through R_1. with this the voltage of point C gradually rises. when the voltage of C gradually rises. the output of point A changes to positive, changing the point B to the direction of the negative. And the process repeats

Integrator circuit using Inductor.



$V^- = V_f = 0V$ grounted virtual short cir.

opamp ideal; current through = 0A.

I through resistor R = $\frac{0 - V_o}{R} = -\frac{V_o}{R}$ ①

Apply KCL to P.

$I_L = 0 + I$ $\quad I = I_L$ ——— ②

~~Apply KCL~~

voltage accross Resistor

$$v_L = v_i - 0 \qquad v_L = v_i \text{ ——— (3)}$$

Inductor voltage given by,

$$v_L = L \frac{dI_L}{dt}$$

From (1) and (2)

$$v_L = L \frac{dI_L}{dt} = L \frac{d(-v_o/R)}{dt}$$

$$\therefore v_L = -\frac{L}{R} \frac{dv_o}{dt}$$

from (3) we have,

$$v_i = -\frac{L}{R} \frac{dv_o}{dt}$$

$$\text{or, } \frac{dv_o}{dt} = -\frac{R}{L} v_i$$

$$\therefore dv_o = -R/L \, v_i dt$$

Integrating both side:

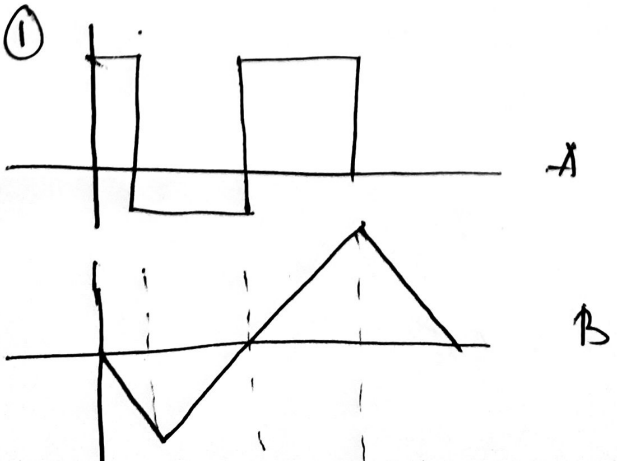
$$\int dv_o = -\int R/L \, v : dt$$

$$\therefore v_o = v_o = -R/L \int v dt + C.$$

k = constant

Report

(1)



$$F = \frac{1}{9 \times 10 \times 10 \times 4 \times 10^{-6}} \times 10/4$$

$$= 156.25 \text{Hz}$$

Theoritical Freq.	Experimental Time Period	Experimental Freq
156.25 Hz	7.7 ms	130.9 Hz

$$F = \frac{1}{4 \times 10 \times 0.4 \times 10^{-6} \times 10^{3}} \times \frac{10}{4}$$

~~$= 156.25 \text{ Hz}$~~

$= 156.25 \text{ Hz}$

Theoritical Frequency	Experimental Time Period	Experimental Frequency
156.25 Hz	7.7 ms	130.9 Hz

31/7/22