



Exp.No.8

FUNCTION SIGNAL GENERATOR

AIM:

To generate square wave and triangular wave using IC741 Op-amp.

APPARATUS:

1. Operational Amplifier mA 741 IC –2No.
2. Resistors
3. Capacitors
4. Dual Power supply(0-20V)
5. Multimeter
6. CRO and Probes.
7. Bread board
- 8.Connecting wires

THEORY:

Function generator generates waveforms such as sine, triangular, square waves and so on of different frequencies and amplitudes. The circuit shown in fig is a simple circuit which generates square waves and triangular waves simultaneously.

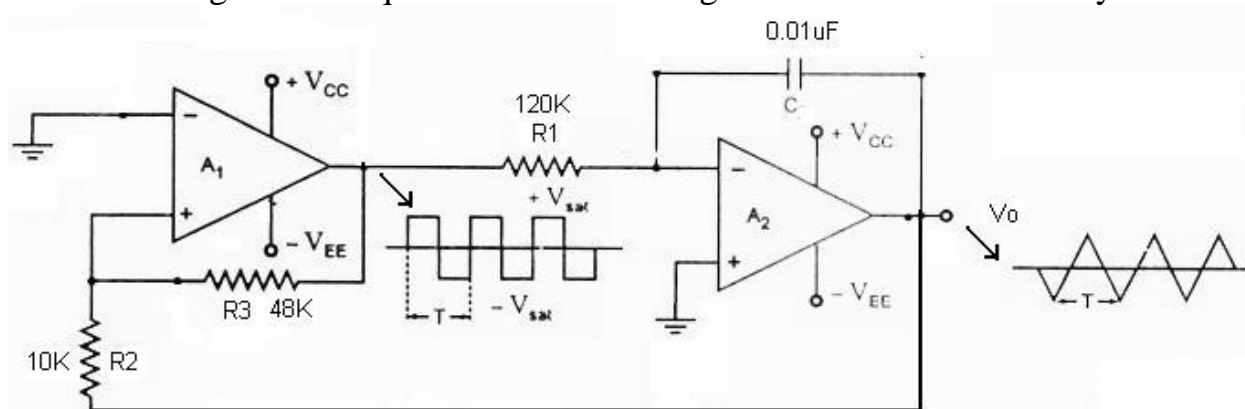


Fig: Signal Generator configuration of op-amp

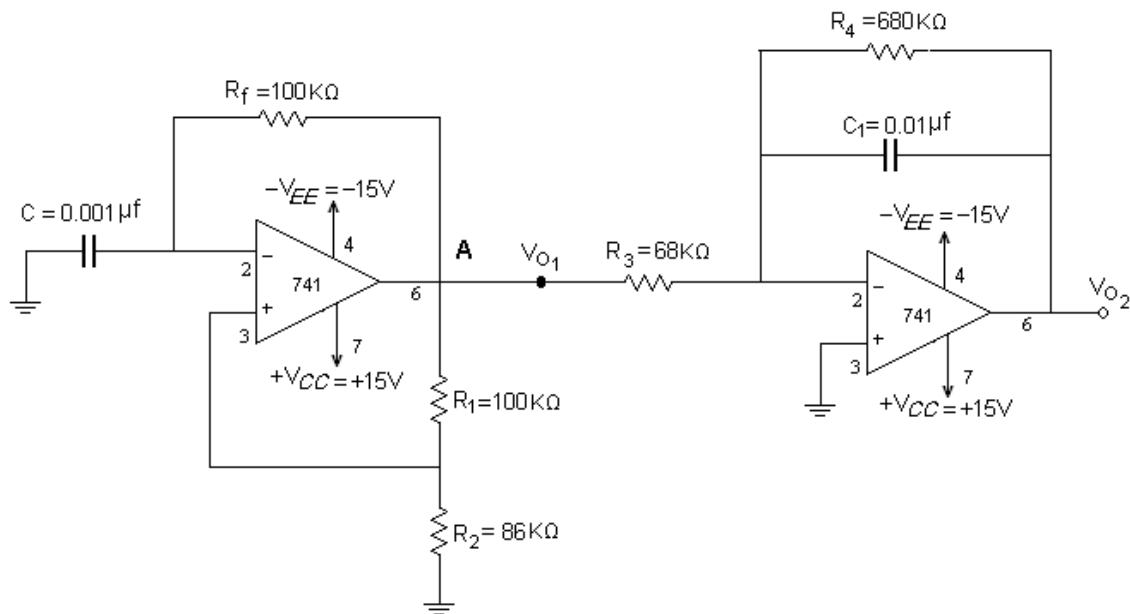
Here the first section is a square wave generator and second section is an integrator. We know that the integrator output waveform will be triangular if the input to it is square-wave. When square wave is given as input to integrator it produces triangular wave. The rectangular-wave output of the square-wave generator drives the integrator which produces a triangular output waveform.



The input of integrator A2 is a square wave and its output is a triangular waveform, the output of integrator will be triangular wave only when $R_1 C > T/2$ where T is the (period of square wave.)

It means that a wave generator can be formed by simply cascading an square-wave generator and a integrator, as illustrated in figure. This circuit needs a dual op-amp, capacitors, and resistors.

CIRCUIT DIAGRAM:



PROCEDURE:

1. Initially set $+V_{CC} = 12$ volts and $-V_{CC}$ to -12 volts.
2. Measure all resistors that are used in the amplifier circuits using the multimeter and record these values
3. As shown in the circuit diagram connect the circuit on a breadboard.
4. Before turning any power on, double check the wiring to make sure that it is correct. Make sure that the power supply to the op-amp is correctly wired as not to apply the incorrect polarity to the op-amp.
5. No Input signal is feed from function generator. It is self generating.

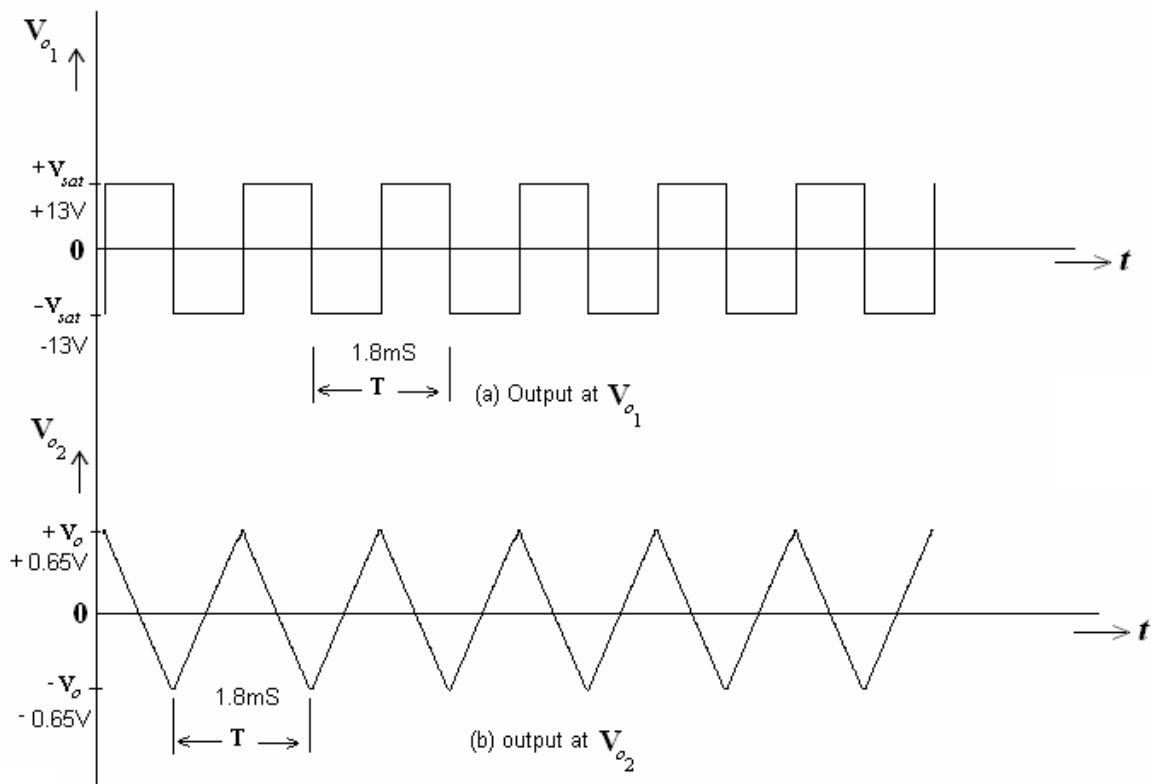


6. Observe the square wave output at 1st op-amp sixth pin and triangular wave output at 2nd op-amp sixth pin on CRO.

7. Calculate the frequency and amplitude of the square and triangular wave observed from the CRO. Frequency can be varied by changing RC combination.

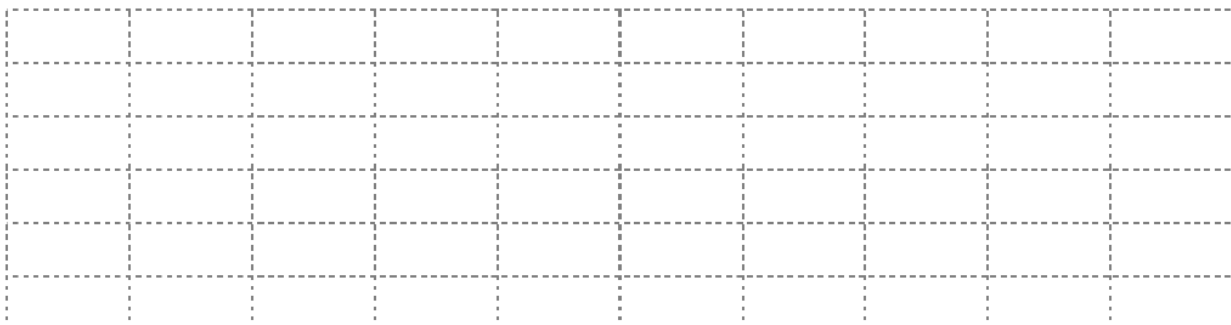
8. Draw the output waveforms on graph paper.

EXPECTED GRAPH:



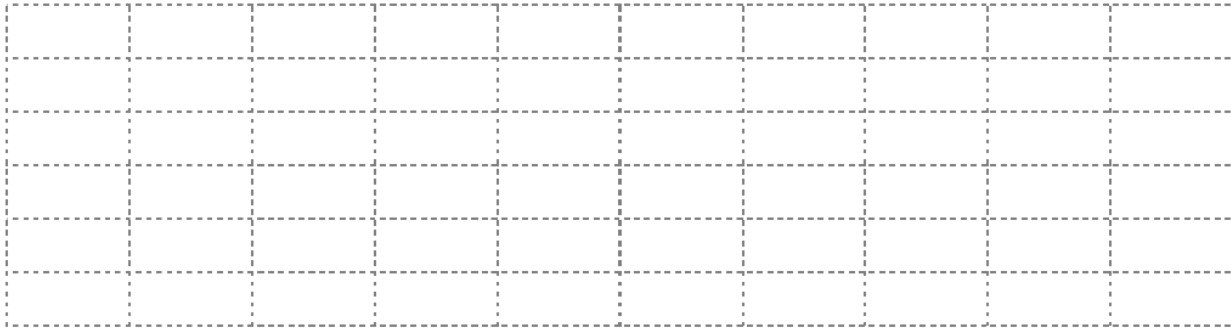
WORKSHEET:

Output Waveform at V_{o1} :





Output Waveform at V_{o2} :



RESULT:

Hence Square and triangular waveforms are generated using 741 Op-Amp function generator and the output waveforms are observed.