

## **Title of the experiment:**

### **Function Generator using NE566**

#### **Theory:**

NE/SE566 is a voltage controlled oscillator which has outstanding linearity. It is a function generator from which we can extract square and triangle wave outputs. We have to design the circuit with an external resistor as well as capacitor such that by varying them, the frequency can be varied. Therefore, the output frequency of NE/SE 566 is the function of the resistor and capacitor connected externally. The frequency can be also be varied by varying the voltage applied across the control terminal.

The circuit can be programmed such that it can produce a maximum of 1MHz frequency of oscillation. The schematic diagram below represents the typical connection diagram. Pin no. 5 of the Integrated Circuit NE/SE 566 which is a control terminal (voltage =Vc) must be always biased by an external source between 0.75 V to Vcc, where Vcc is total supply voltage.

The control voltage is controlled here in the circuit by using voltage divider formed with R1 and R2. Coming to the modulating signal it can be coupled in two ways, one way is the AC coupled with capacitor C3. Another way is the direct coupling (if an appropriate DC bias voltage is connected directly to the control terminal).

The frequency of the output is given approximately as

$$f_o = 2 \frac{(V_{cc})+(V_c)}{R_1 * C_1 * V_{cc}}$$

Where  $f_o$  is the frequency of oscillation.

Vcc is the supply voltage. Vc is the control voltage.

R1 and C1 are the external resistor and capacitor respectively (used for controlling of frequency.)

R3 should be in the range  $2k\Omega < R_3 < 20k\Omega$ . A small capacitor (typically  $0.001\mu F$ ) can be connected between Pins 5 and 6 to eliminate possible oscillation in the control current source.

## Schematic Diagram:

The circuit schematic of Function Generator in eSim is as shown below:

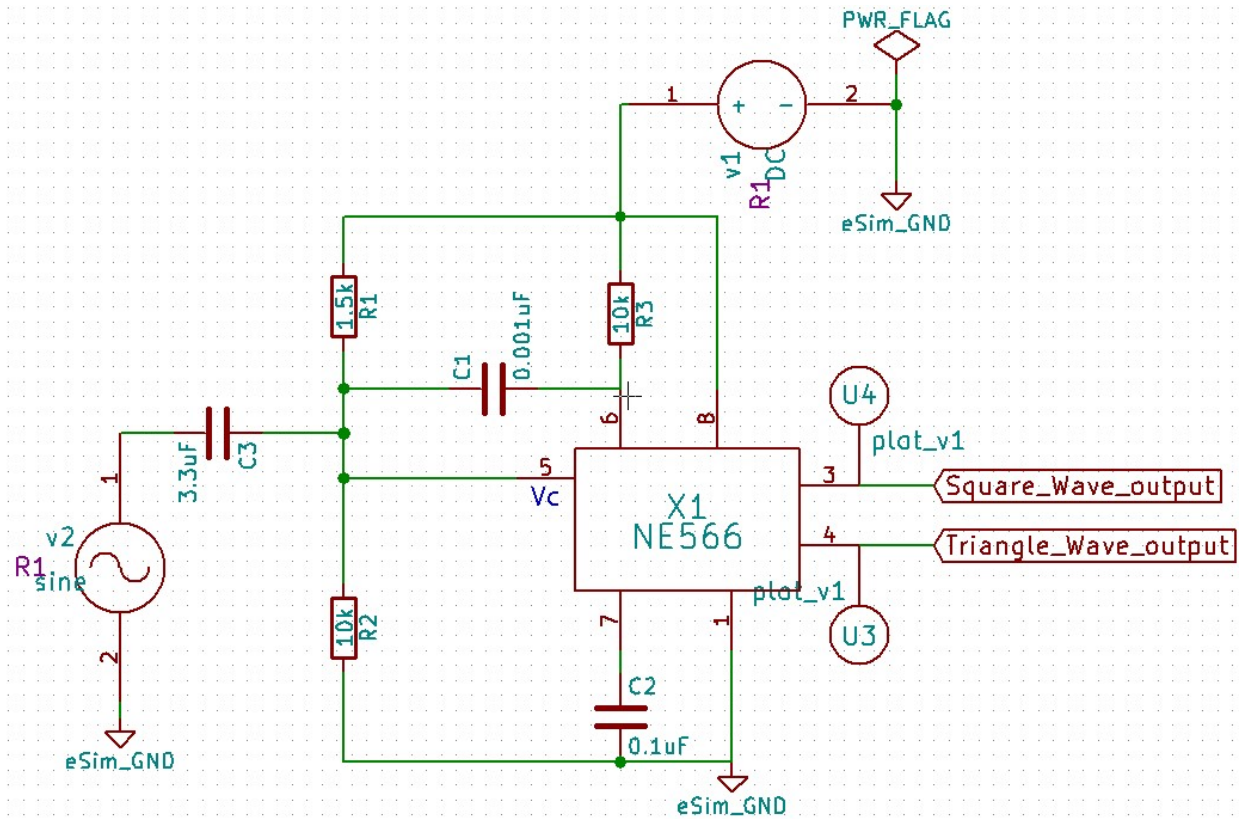


Figure 1: Function Generator using NE566

# SUB CIRCUIT:

The sub circuit schematic of NE566 in eSim is as shown below:

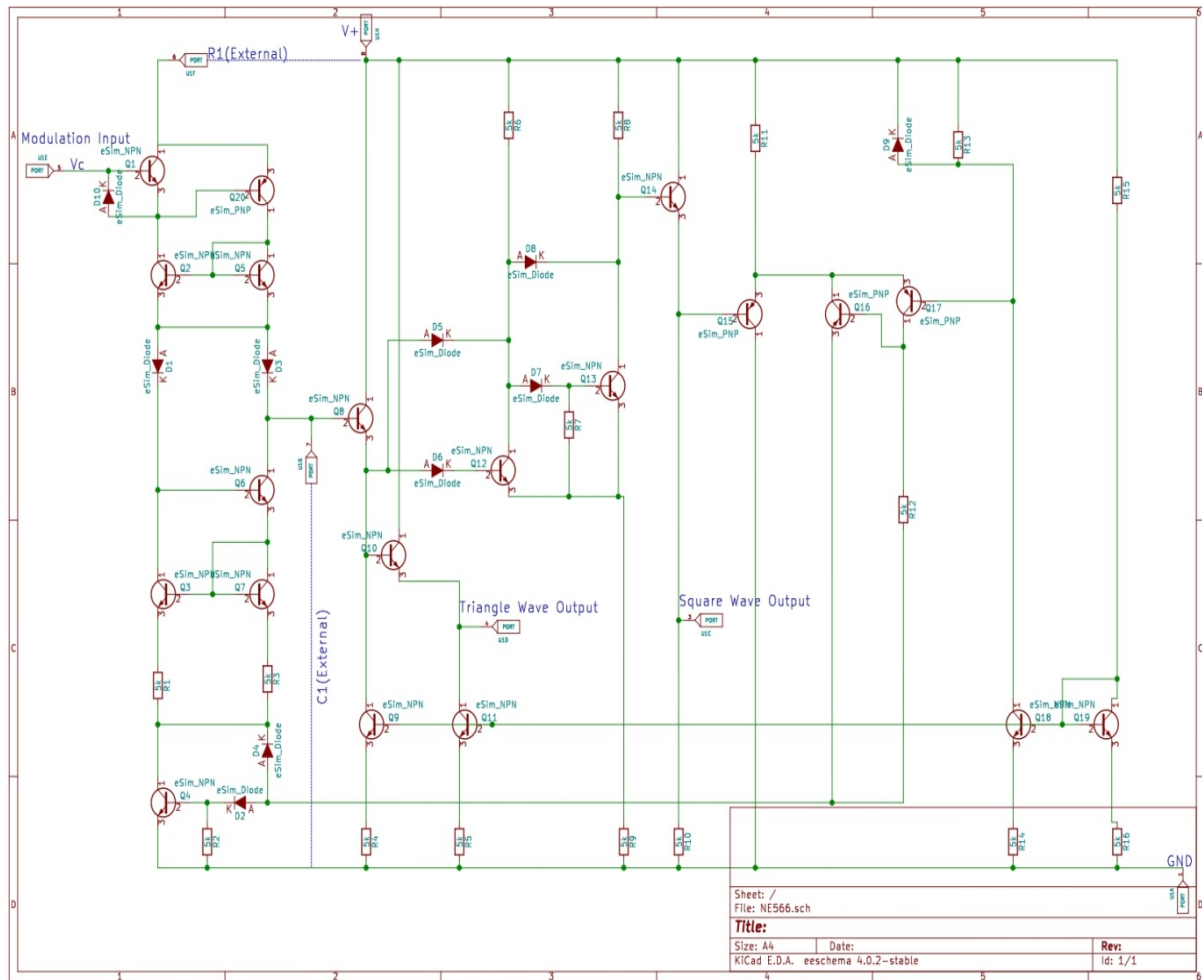


Figure 2: NE566

## Simulation Results:

### 1. Python plot

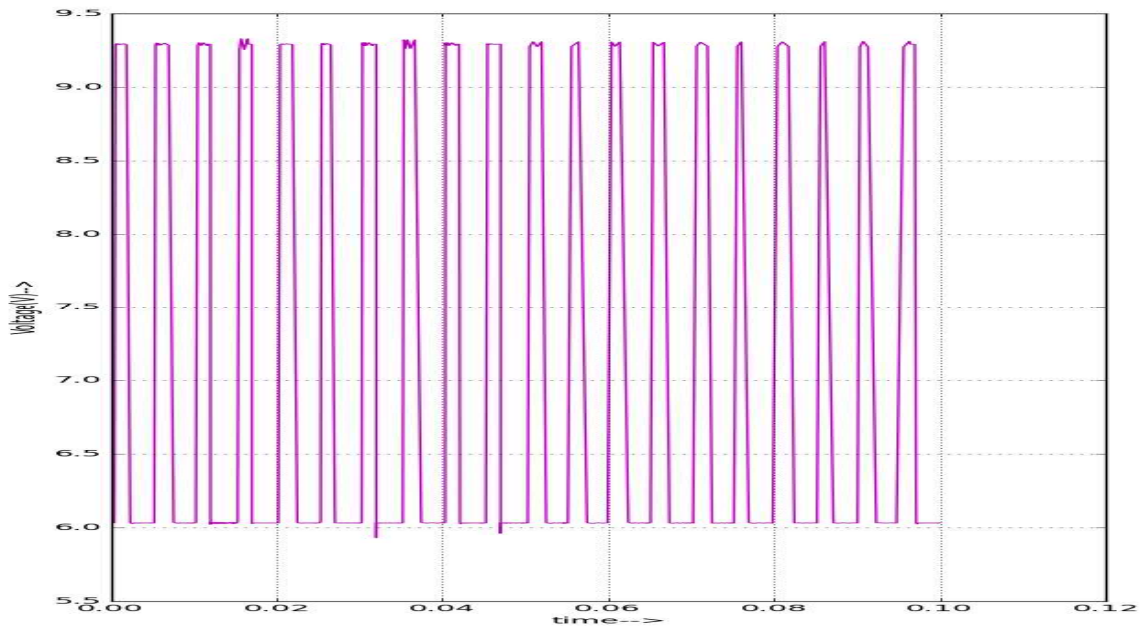


Figure 3: Square wave output python plot

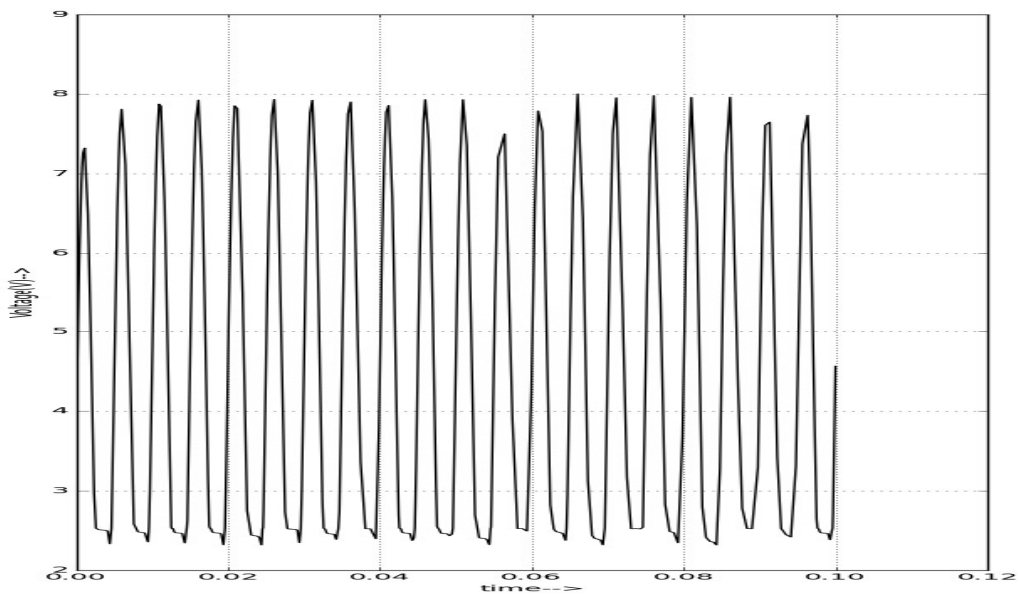


Figure 4: Triangular wave output Python Plot

## 2. Ngspice plots

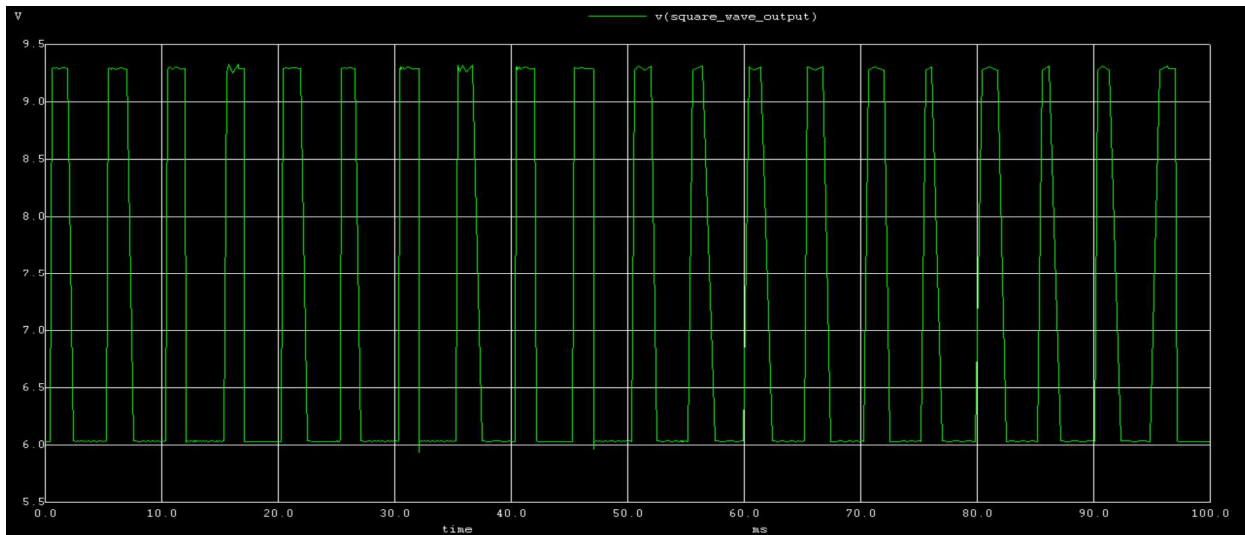


Figure 5: Square wave output Ngspice plot

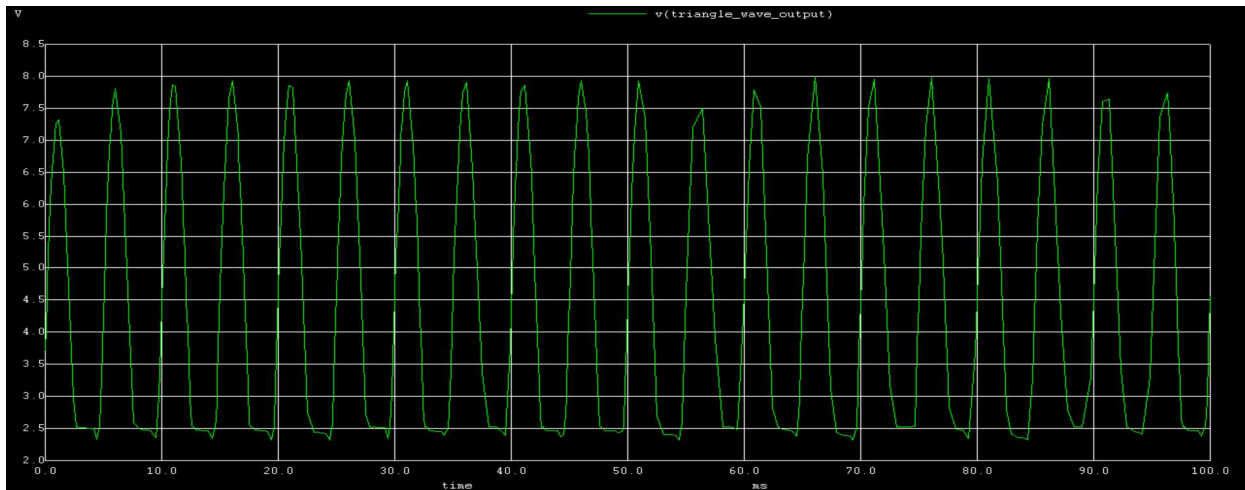


Figure 6: Triangular wave output Ngspice plot

Reference:

[1]. [https://img.ozdisan.com/ETicaret\\_Dosya/485105\\_9303808.PDF](https://img.ozdisan.com/ETicaret_Dosya/485105_9303808.PDF) .