

Title of the experiment:

Function Generator using NE566

Theory:

The NE/SE566 Function Generator is a voltage-controlled oscillator of exceptional linearity with buffered square wave and triangle wave outputs. The frequency of oscillation is determined by an external resistor and capacitor and the voltage applied to the control terminal. The oscillator can be programmed over a ten-to-one frequency range by proper selection of an external resistance and modulated over a ten-to-one range by the control voltage, with exceptional linearity.

The NE/SE566 Function Generator is a general purpose voltage-controlled oscillator designed for highly linear frequency modulation. The circuit provides simultaneous square wave and triangle wave outputs at frequencies up to 1MHz. A typical connection diagram is shown in Figure 1. The control terminal (Pin 5) must be biased externally with a voltage (VC) in the range $0.75V+ \leq VC \leq V+$, where VCC is the total supply voltage. In Figure 1, the control voltage is set by the voltage divider formed with R2 and R1. The modulating signal is then AC coupled with the capacitor C3. The modulating signal can be direct coupled as well, if the appropriate DC bias voltage is applied to the control terminal. The frequency is given approximately by

$$f_O = 2 [(V+) + (VC)] / R1 C1 V+$$

R3 should be in the range $2k\Omega < R1 < 20k\Omega$. A small capacitor (typically $0.001\mu F$) should 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:

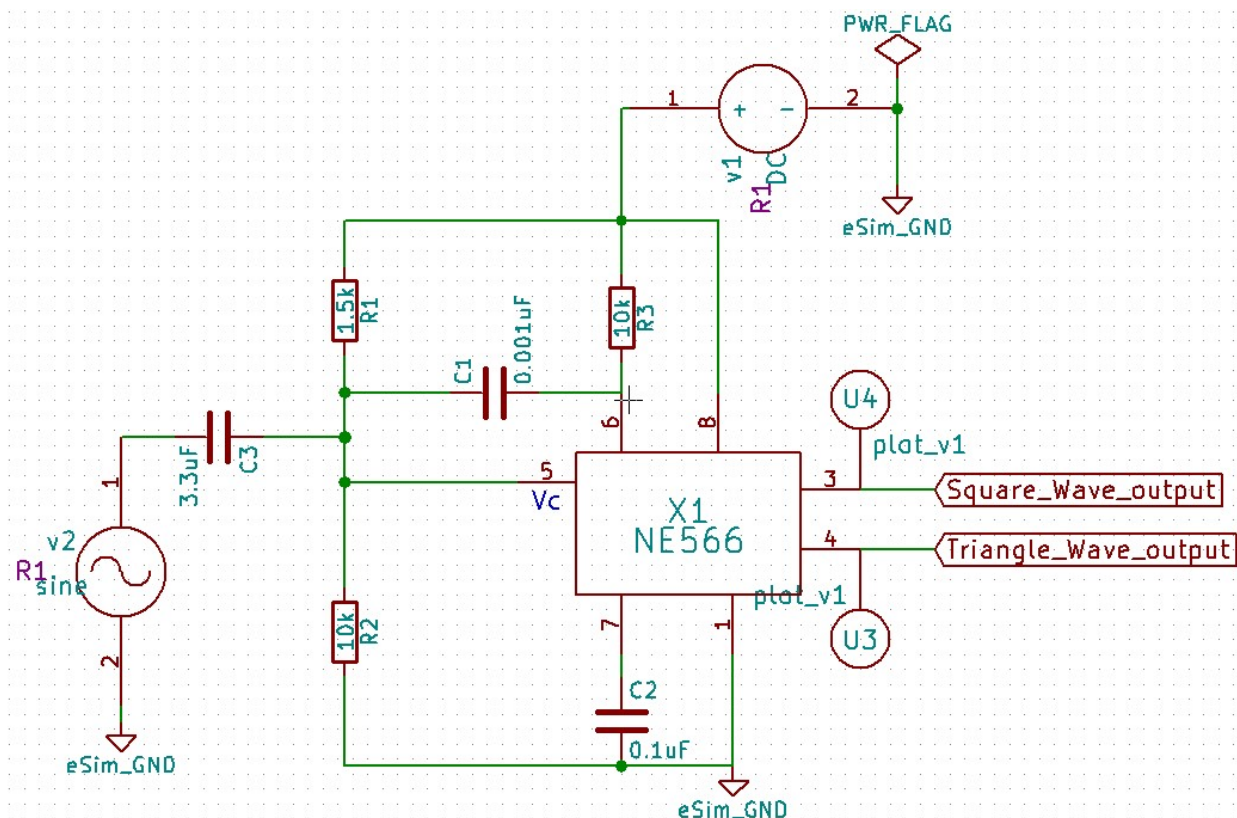


Figure 1: Function Generator using NE566

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

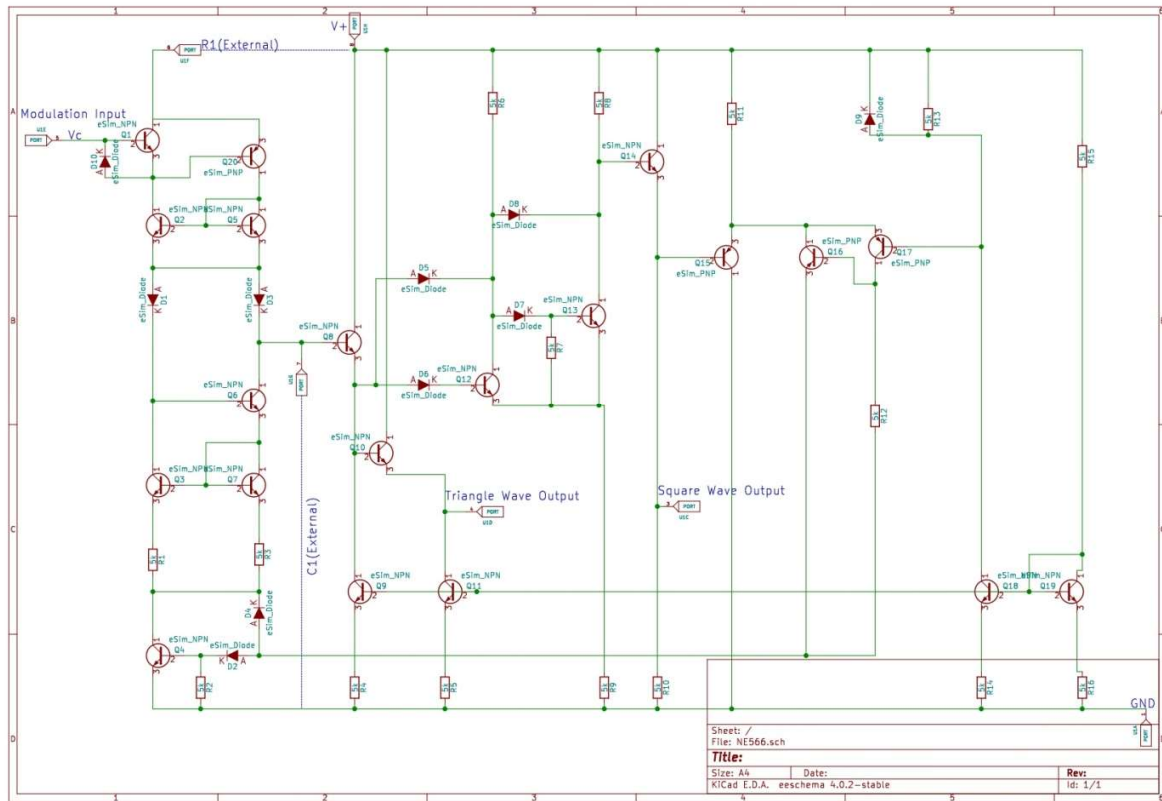


Figure 2: NE566

Simulation Results:

1. Python plot

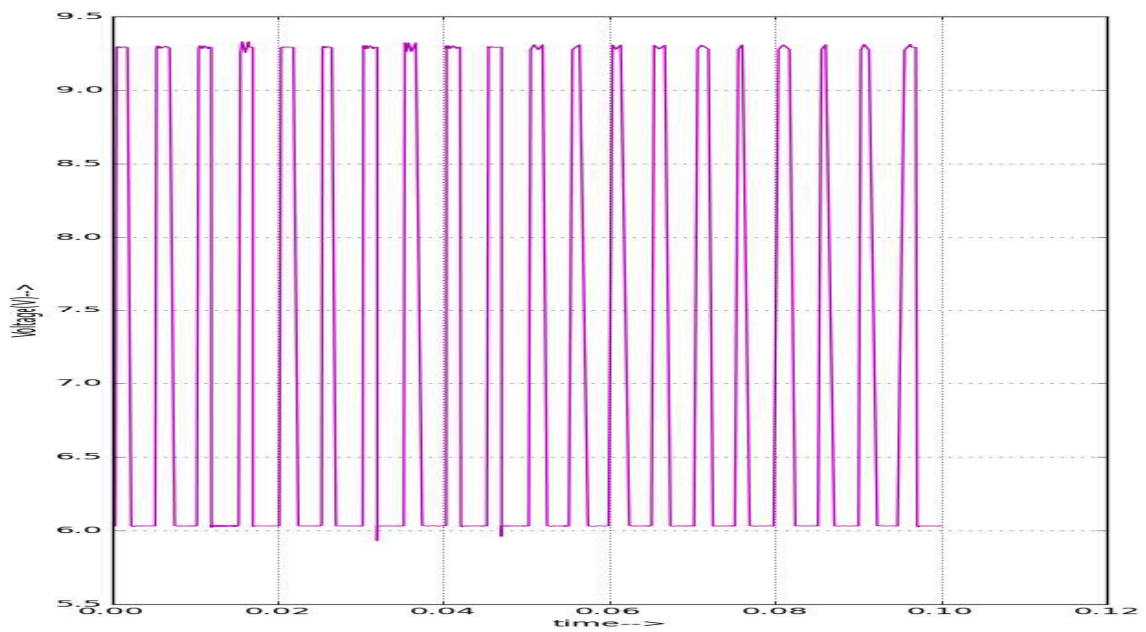


Figure 3: Square wave output python plot

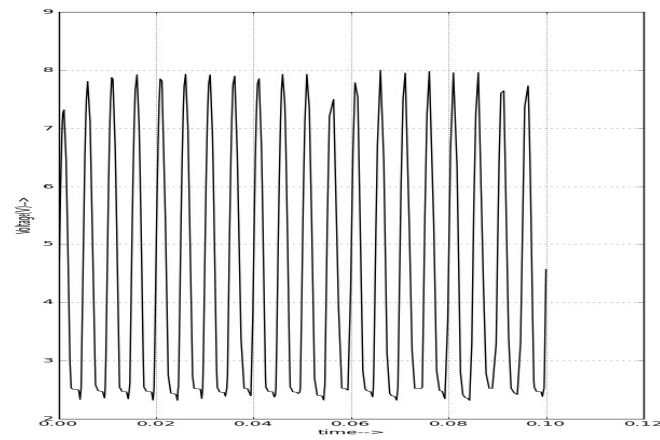


Figure 4: Triangular wave output Python Plot

2. Ngspice plots

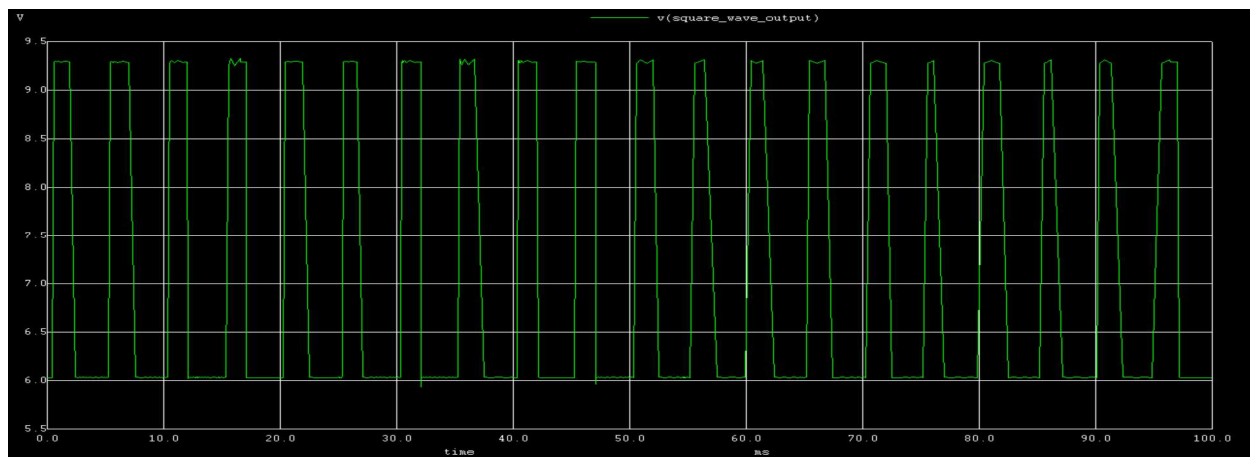


Figure 5: Square wave output Ngspice plot

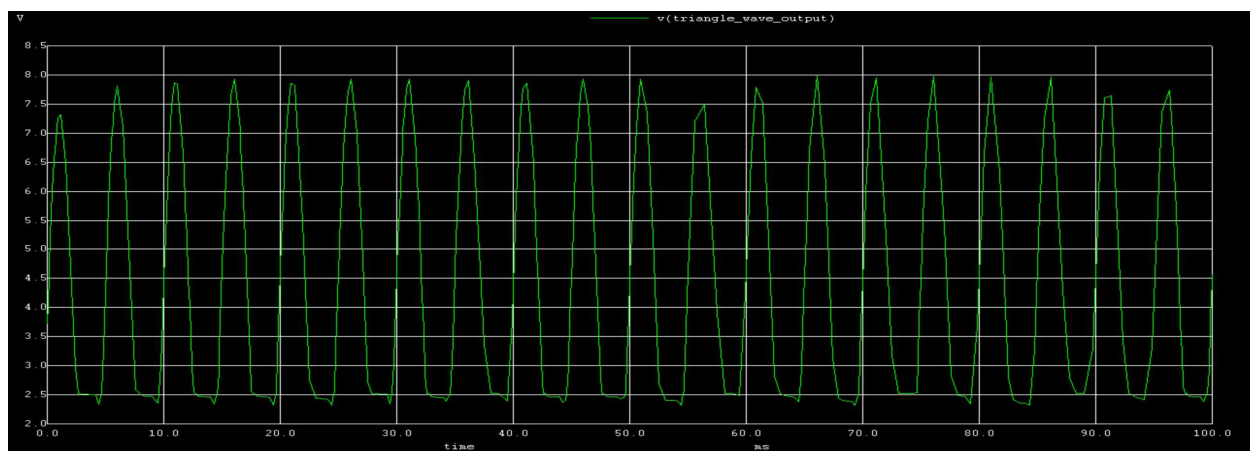


Figure 6: Triangular wave output Ngspice plot

Reference:

[1]. https://img.ozdisan.com/ETicaret_Dosya/485105_9303808.PDF referred on 26-03-2019.