CLAPPS OSCILLATOR

SHUBANGI MAHAJAN

Indian Institute of Information Technology, Trichy

INTRODUCTION

Clapp oscillator is a variation Of Colpitts oscillator.The circuit differs from the Colpitts oscillator only in one respect; it contains one additional capacitor (C_3) connected in series with the inductor. The addition of capacitor (C_3) improves the frequency stability and eliminates the effect of transistor parameters and stray capacitances.

Apart from the presence of an extra capacitor, all other components and their connections remain similar to that in the case of Colpitts oscillator. Hence, the working of this circuit is almost identical to that of the Colpitts, where the feedback ratio governs the generation and sustainability of the oscillations. However, the frequency of oscillation in the case of **Clapp oscillator** is given by

$$f_o = 1/2\pi\sqrt{L.C}$$

Where

$$C = 1/(1/C_1 + 1/C_2 + 1/C_3)$$

Usually, the value of C_3 is much smaller than C_1 and C_2. As a result of this, C is approximately equal to C_3. Therefore, the frequency of oscillation,

$$f_o = 1/2\pi\sqrt{L.C_3}$$

Usually the value of C_3 is chosen to be much smaller than the other two capacitors. Thus the net capacitance governing the circuit will be more dependent on it.

A Clapp oscillator is sometimes preferred over a Colpitts oscillator for constructing a variable frequency oscillator. The Clapp oscillators are used in receiver tuning circuits as a frequency oscillator. These oscillators are highly reliable and are hence preferred inspite of having a limited range of frequency of operation.
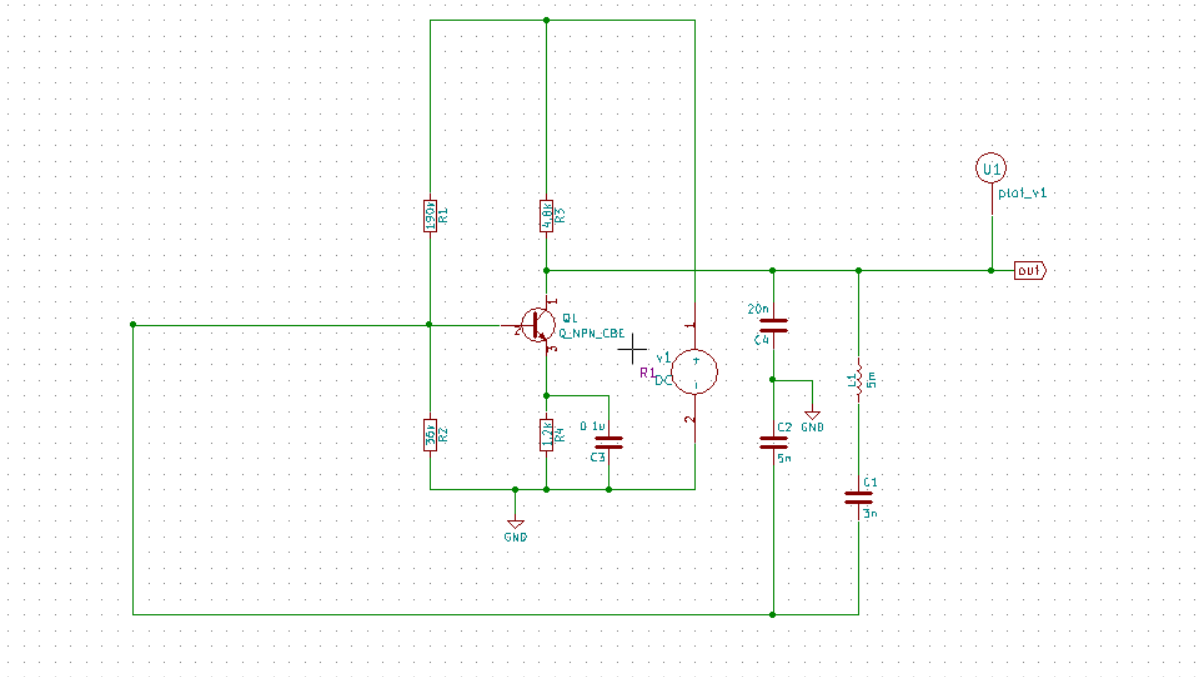
SCHEMATIC DIAGRAM

Figure 1: Schematic diagram of clap oscillator
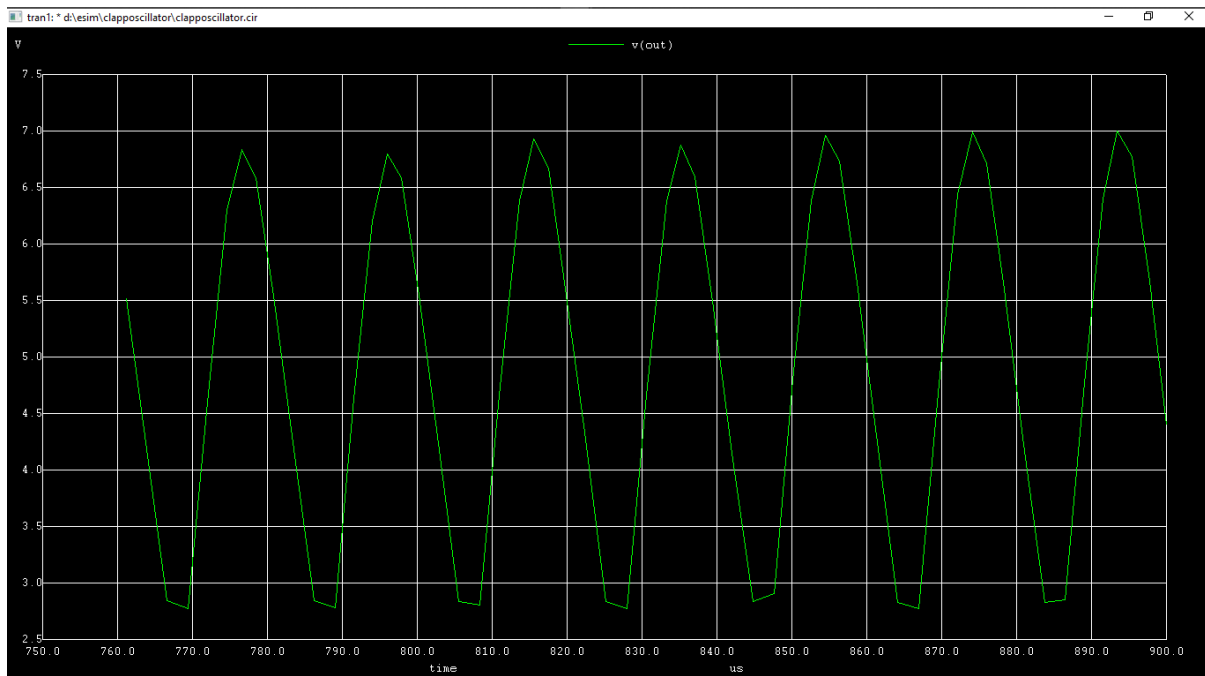
NgSpice Plots:
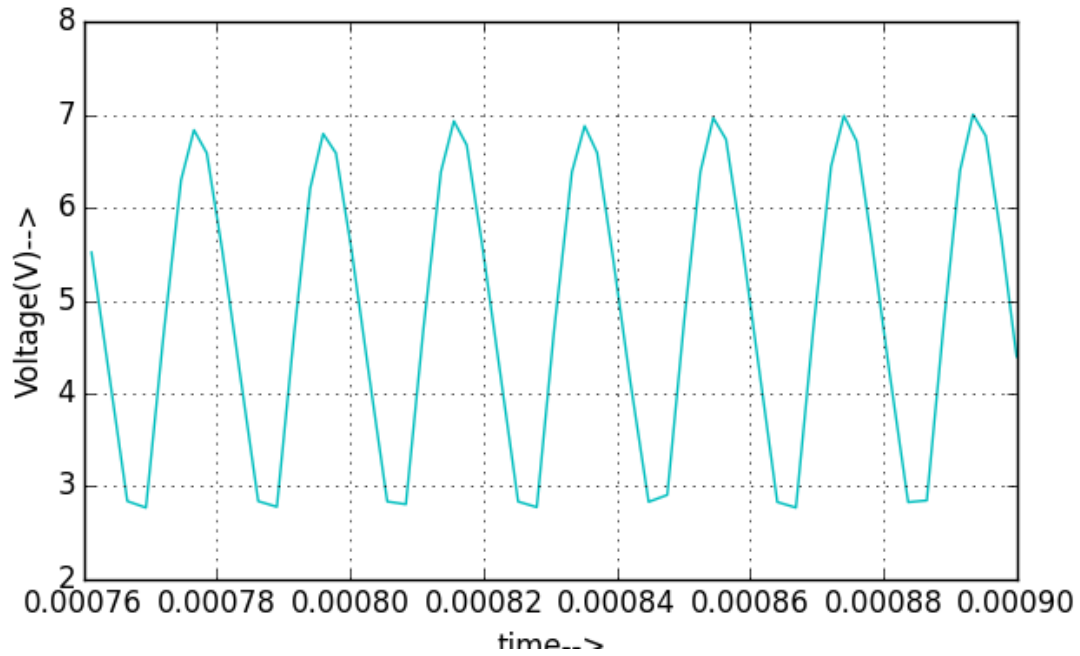

Figure 2: Output Plot

PYTHON PLOT:

Figure 3: output plot

REFERENCES

- https://www.tutorialspoint.com/sinusoidal_oscillators/sinusoidal_clapp_oscillator.htm
- https://www.electrical4u.com/clapp-oscillator/