WEINBRIDGE OSCILLATOR

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CIRCUIT DESCRIPTION:

The weinbridge oscillator, also called as wheatstone bridge circuit is used to find the unknown values of components. It is based on the bridge circuit and it consists of four resistors and two capacitors and it is used for the measurement of impedance. The huge amount of frequency is produced by this oscillator. This electronic oscillator produces sine waves. It is a two stage RC amplifier circuit and it has high quality of resonant frequency, low distortion and also in the tuning.

This oscillator has stable in frequency output and the maximum output frequency is 1MHz and this frequency is from the phase shift oscillator. The total phase shift of the oscillator is 0° or 360° in which 180° phase shift is introduced in the amplifier stage and additional 180° phase shift is introduced by feedback network. The circuit has the lead lag networks in which the lags at the phase shift are increasing the frequency and the leads are decreasing the frequency.

Due to the advantages in this oscillator, it becomes the most popular audio frequency range signal generator circuit. This oscillator uses RC feedback network so it can also be considered as RC oscillator.

The frequency of the output signal is given by,

$$f=1 / (2\pi RC)$$

where,

R is the resistance in Ohms,

C is the capacitance in farads.

MODELING:

$$\boldsymbol{f = 1/(2 * \pi * \sqrt{Leq} * C)}$$

GIVEN:

BIASING RESISTOR VALUES

R5=33KΩ,

R2=R9=10KΩ,

R6=R10=2.2KΩ,

R8=1KΩ

R11=18KΩ

TANK CIRCUIT DESIGN

C1=C2=0.01uf

R1=R4=10KΩ

C3=C5=10Uf

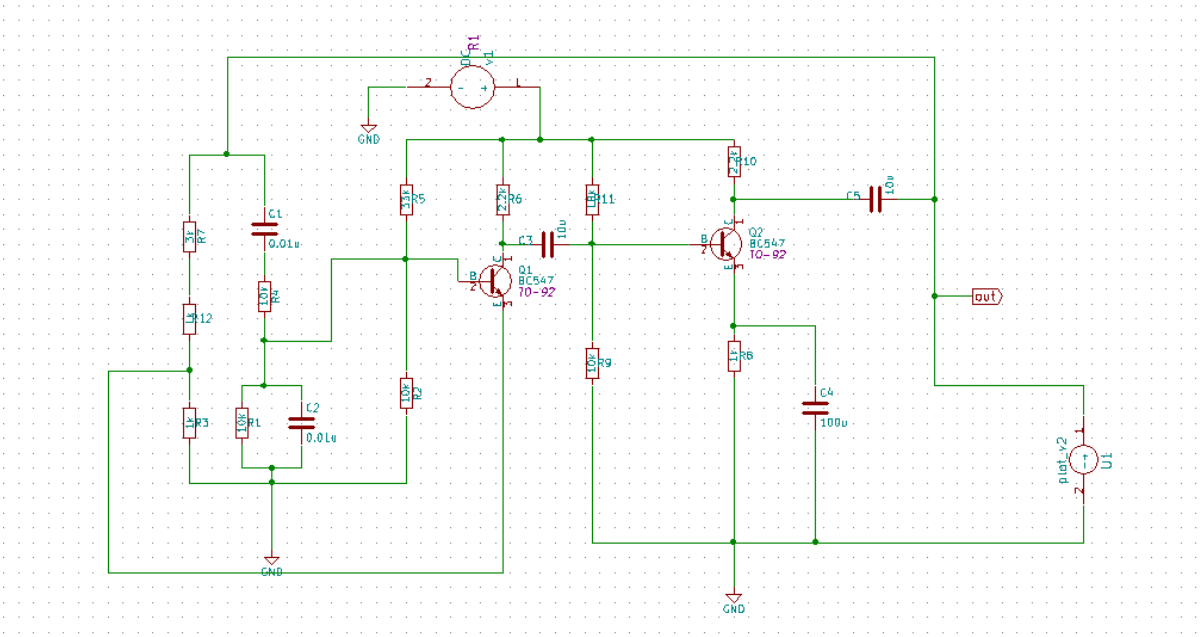
C4=100uF

VOLTAGE DIVIDER RESISTOR VALUES

R3=R12=IKΩ

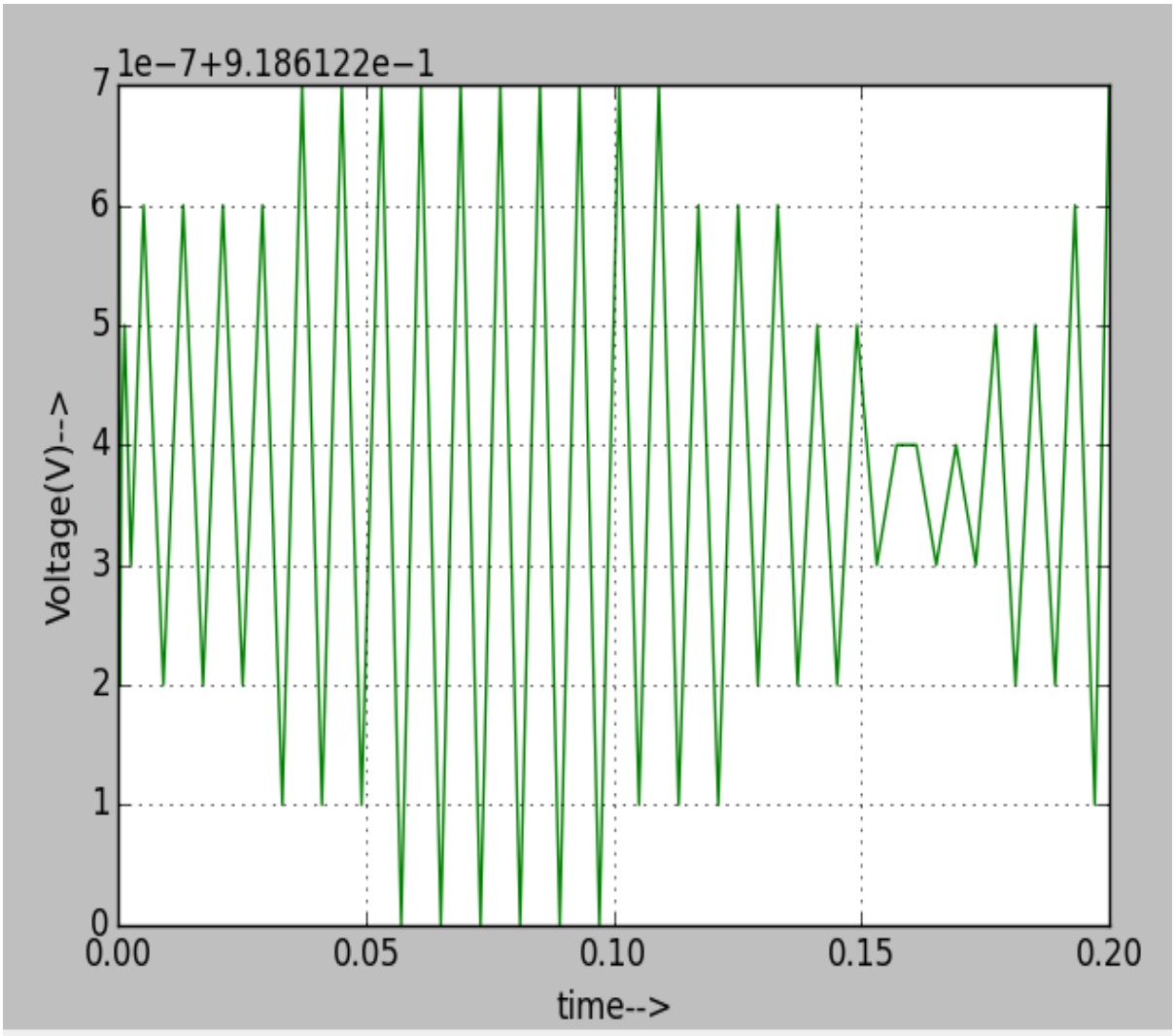
R7=3KΩ

RTL Schematic using esim Software:

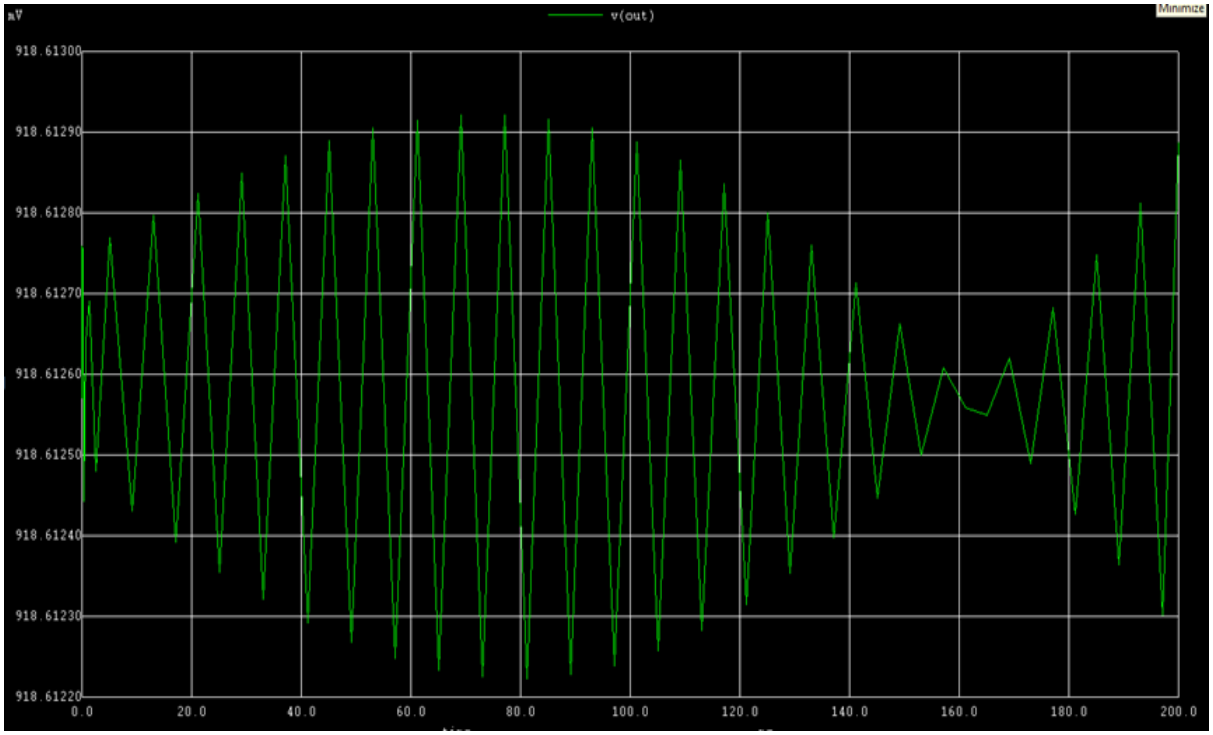


SIMULATION OUTPUT:

PYTHON PLOT:



NGSPICE PLOT:



REFERENCES:

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http://www.electronicshub.org/wein-bridge-oscillator

http://en.m.wikipedia.org/wiki/Wein_bridge_oscillator