Circuit Simulation Project on

Analysis of Voltage Divider Circuit Using OPAMP

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Title of the circuit : Analysis of Voltage Divider Circuit Using OPAMP

Theory/Description :

Analog Divider is a circuit which takes two input as a Voltage and the result is output as divided voltage which is the remainder.

Analog divider has input as V1 and V2, V1 is the Voltage Divident and V2 is the Divisor and the result is obtained at the circuit output as the Voltage Remainder. This circuit consists of the log and antilog amplifier, subtractor and inverting amplifier. The log amplifier output is given to the subtractor circuit along with the offset voltage(0.565). Output of Subtractor is given to the antilog amplifier and obtained the result but it is inverted form, so we use an inverting amplifier to get the correct output. The final Output is Vout = kV1/V2.

The equation for the circuit is shown below

Vout = V1/V2   ...For Eg V1 = 10 and V2 = 2

log(Vout) = log(V1/V2)   ...Taking log on both sides

log(Vout) = logV1-logV2

log(Vout) = 1-0.3010

Vout = antilog(0.699)   ...Taking antilog on both sides

Vout = 5

Analog divider find application in many circuits.

Circuit Diagram :
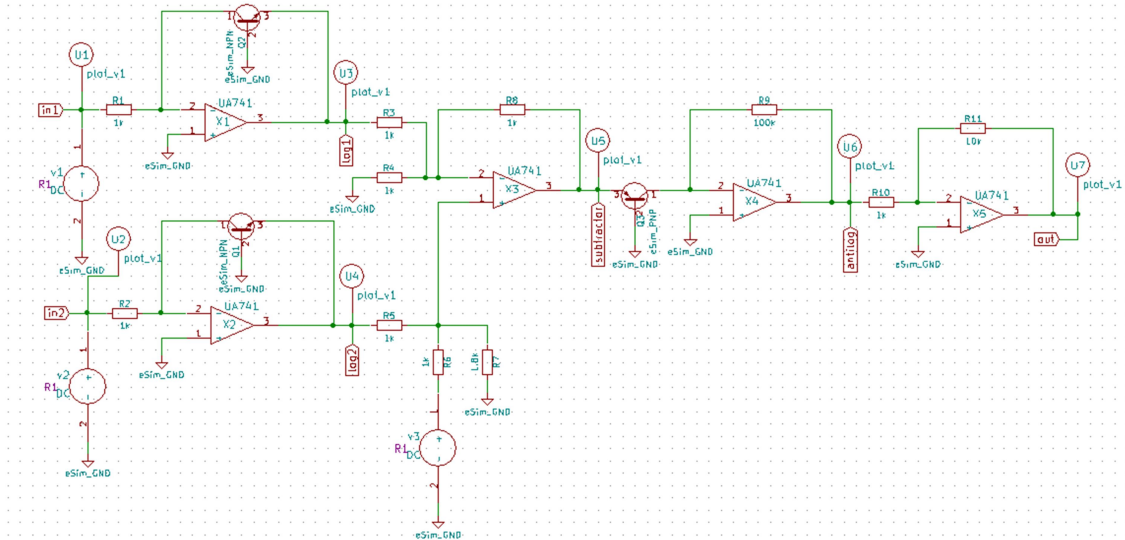

Fig 1 : Schematic of Analog Divider Circuit using OPAMP
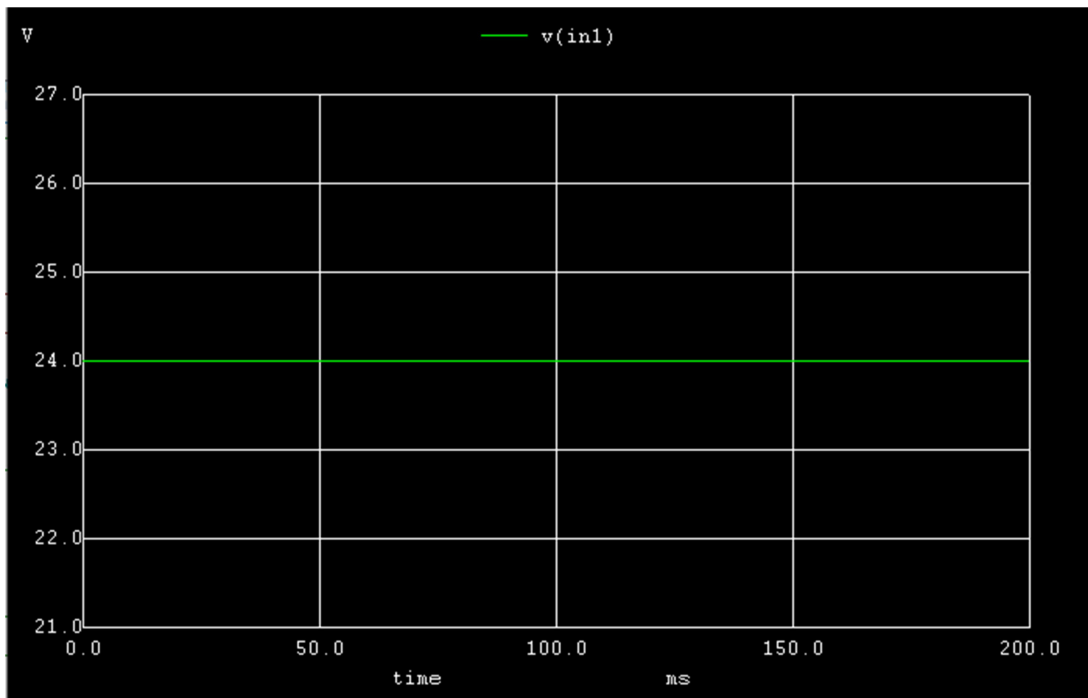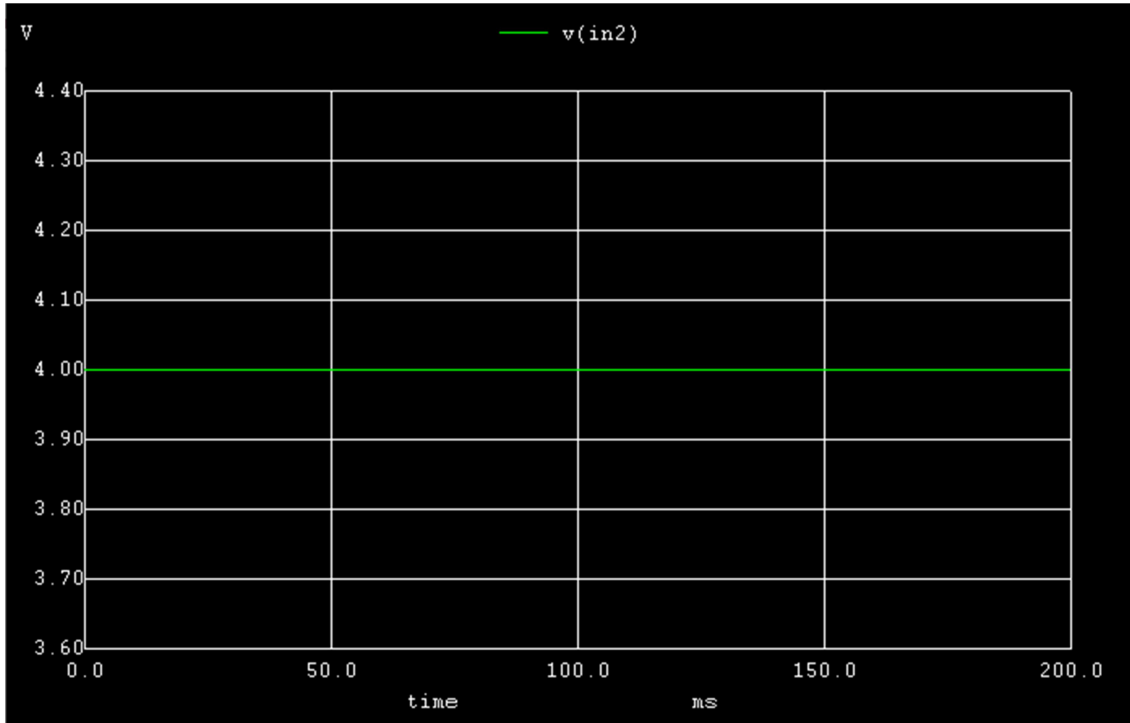
Simulation Results :

1. Ngspice Plots :

Fig 2 : ngspice input 1 plot
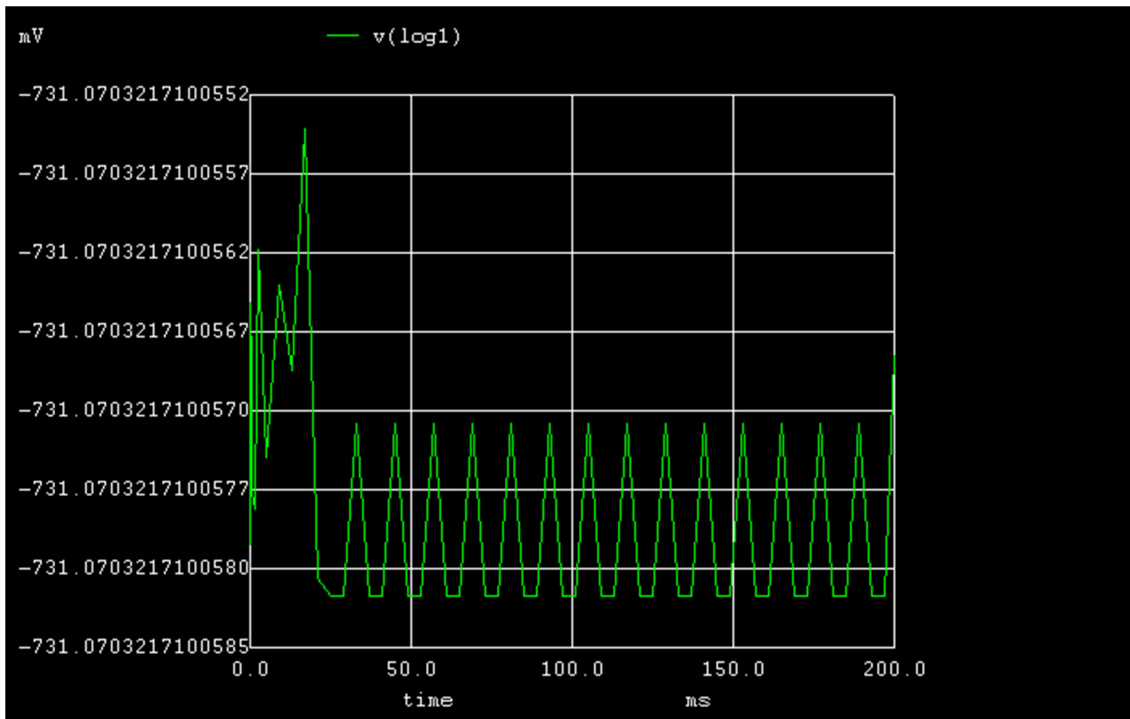
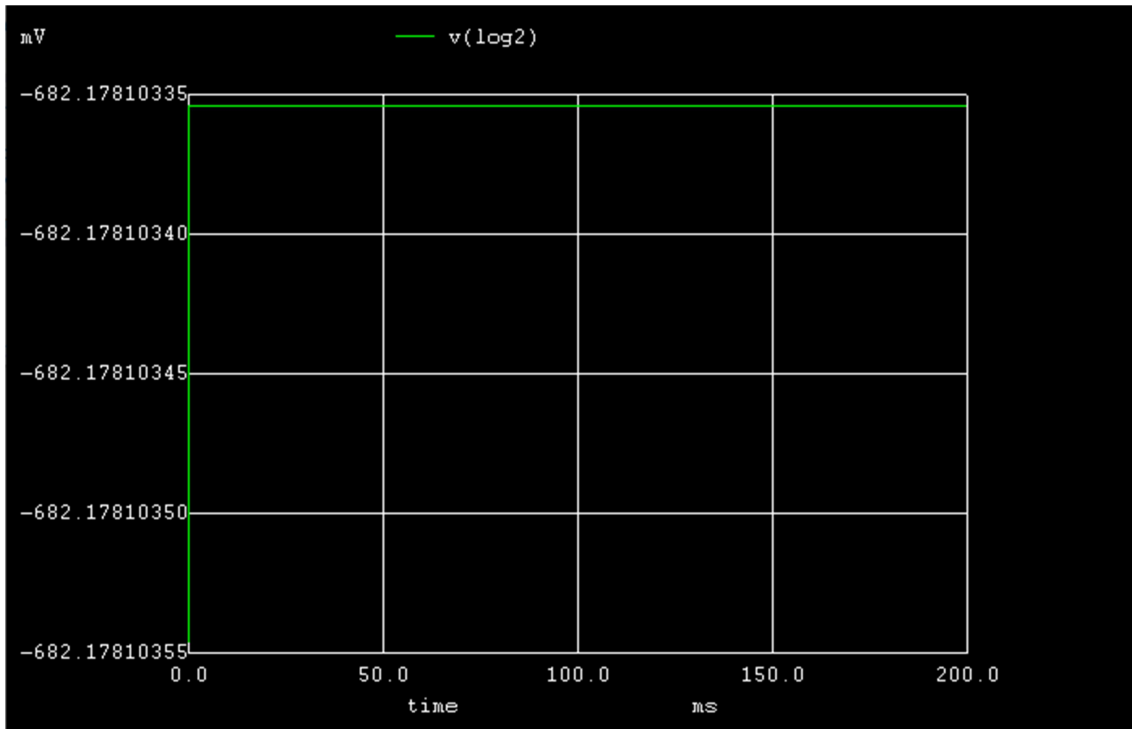. Fig 3 : ngspice input 2 plot

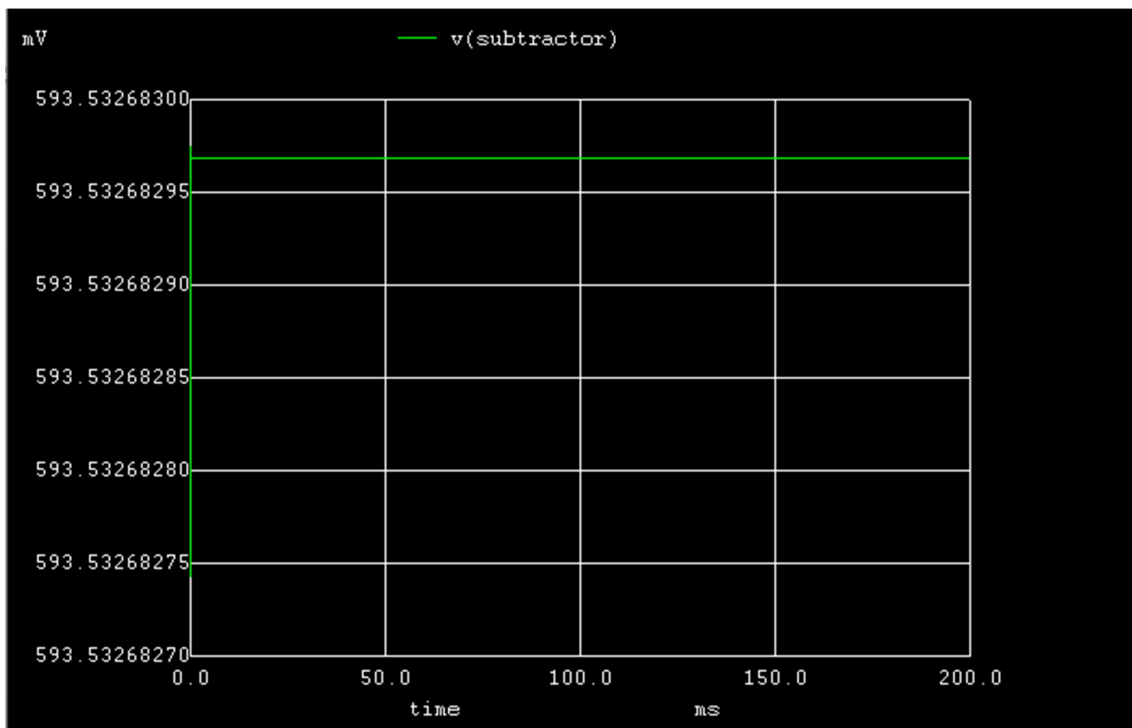Fig 4 : ngspice log 1 plot

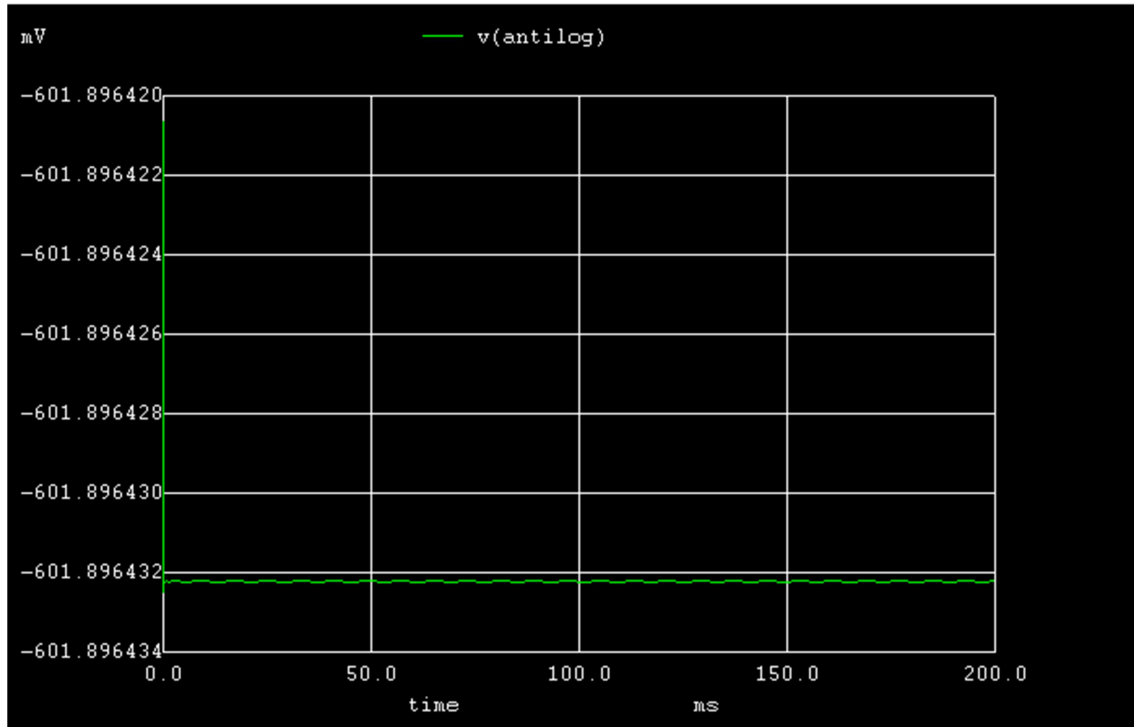Fig 5 : ngspice log 2 plot

Fig 6 : ngspice subtractor plot

Fig 7 : ngspice antilog amplifier plot

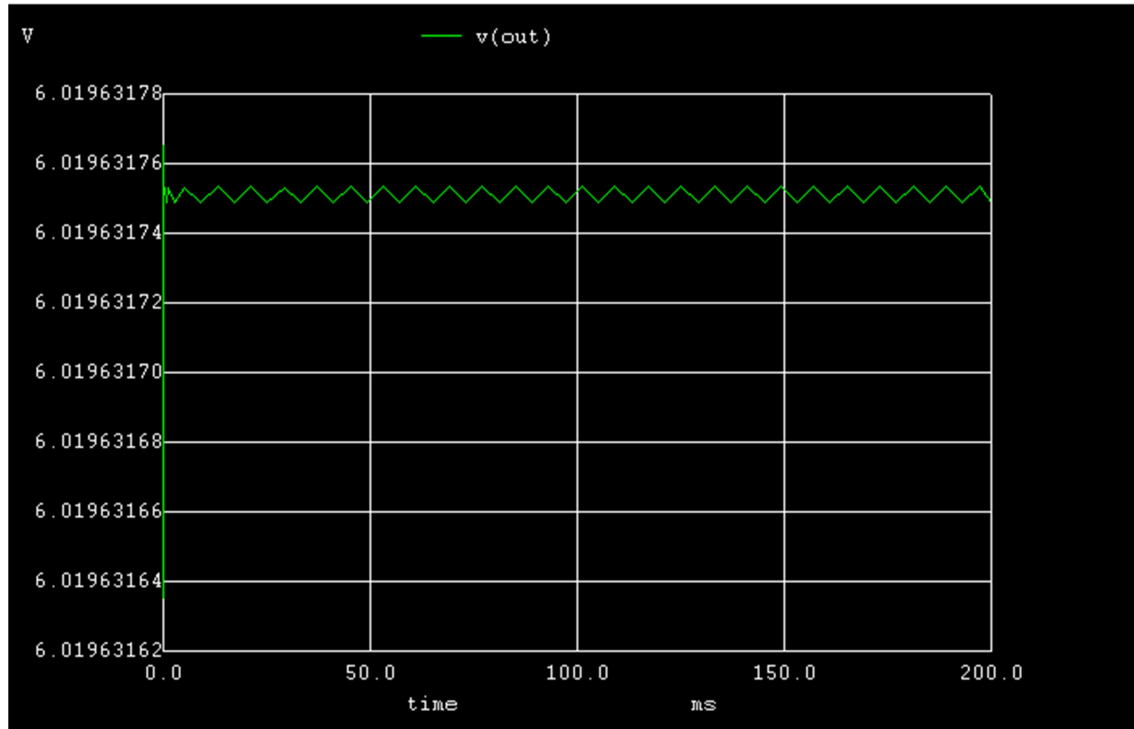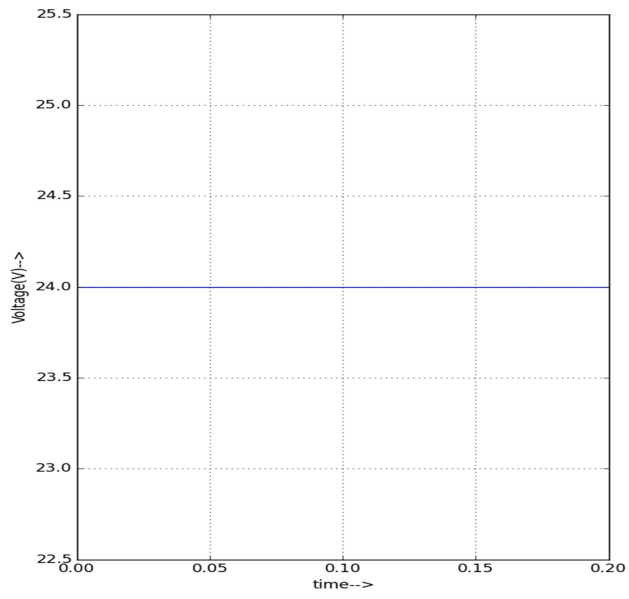

Fig 8 : ngspice output plot

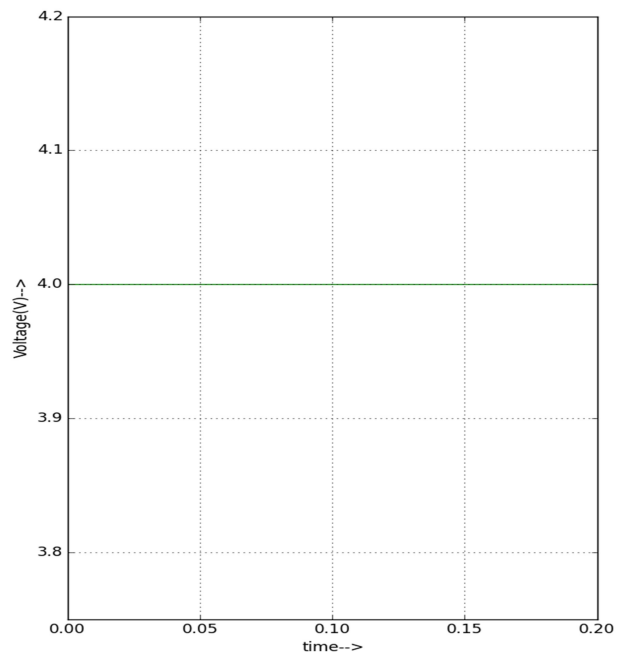2. Python plot

Fig 9 : python input 1 plot
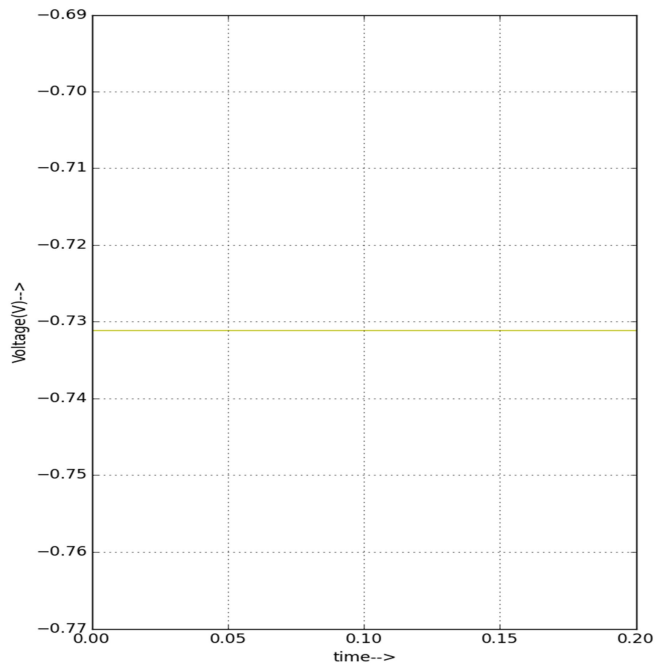

Fig 10 : python input 2 plot
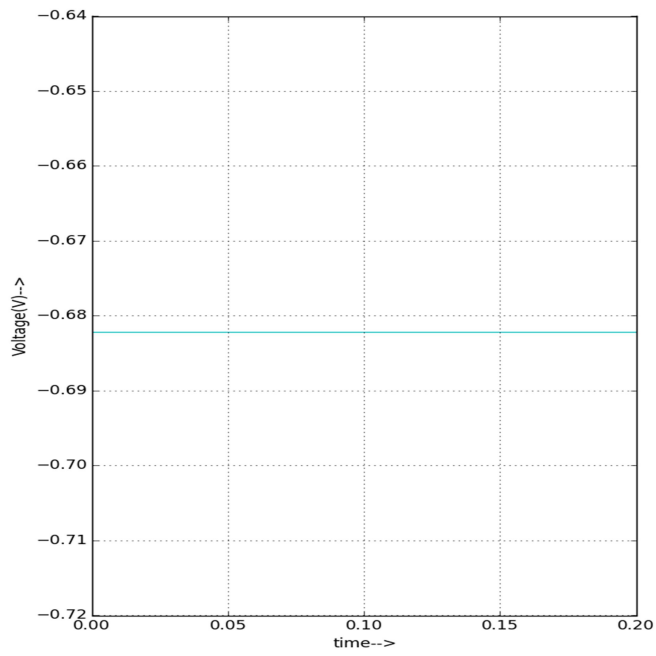
Fig 11 : python log 1 plot
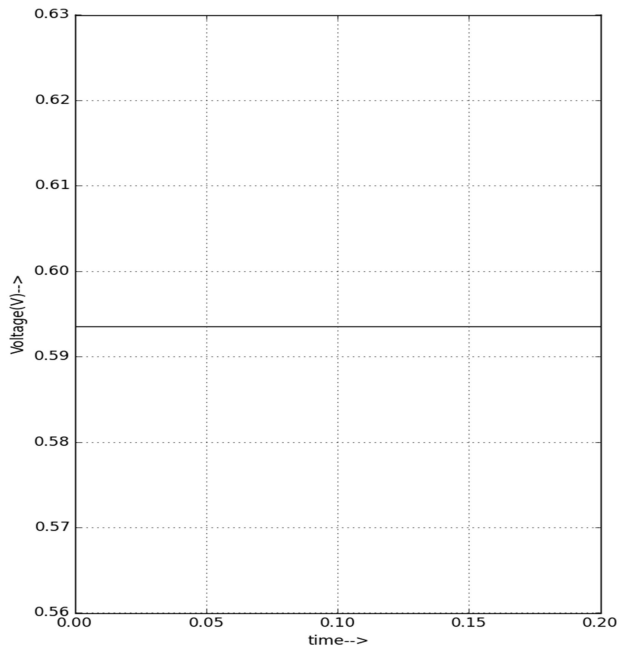

Fig 12 : python log 2 plot
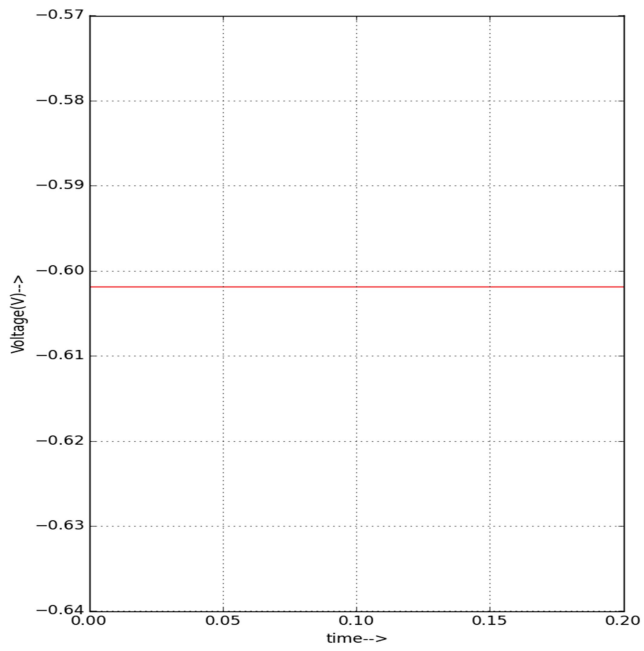
Fig 13 : python subtractor plot
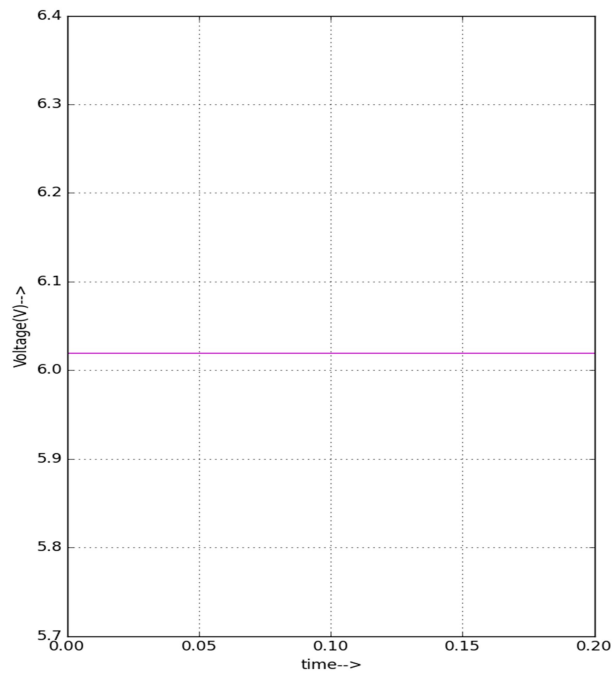

Fig 14 : python antilog plot

Fig 15 : python Output plot

Conclusion: Thus, we have studied the Analysis of Voltage Divider Circuit Using OPAMP in eSim circuit simulation and obtained the appropriate waveform and amplitude in simulation plot of ngspice and python plot .

Source/Reference(s):

1. https://www.tutorialspoint.com/linear_integrated_circuits_applications/linear_integrated_circuits_applications_log_and_anti_log_amplifiers.htm
2. https://www.electronics-tutorial.net/analog-integrated-circuits/subtractordifference-amplifier/
3. https://www.electronics-tutorial.net/mini-projects/ANALOG-SIGNAL-DIVIDER/
4. https://ecetutorials.com/analog-electronics/inverting-and-non-inverting-amplifiers/