Logarithmic Amplifier Circuit Using Op-Amp

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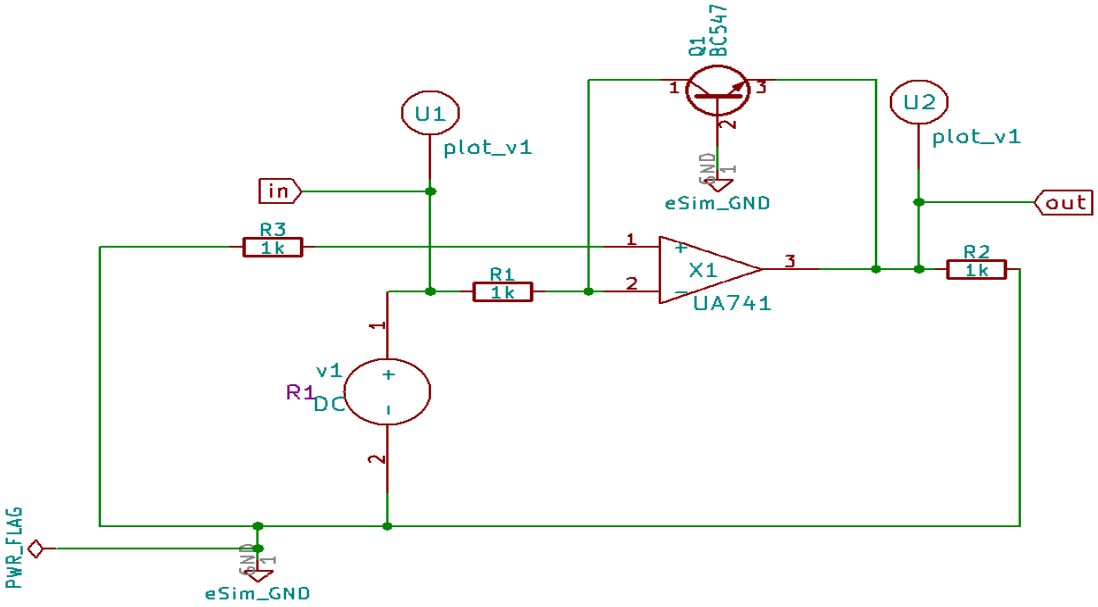
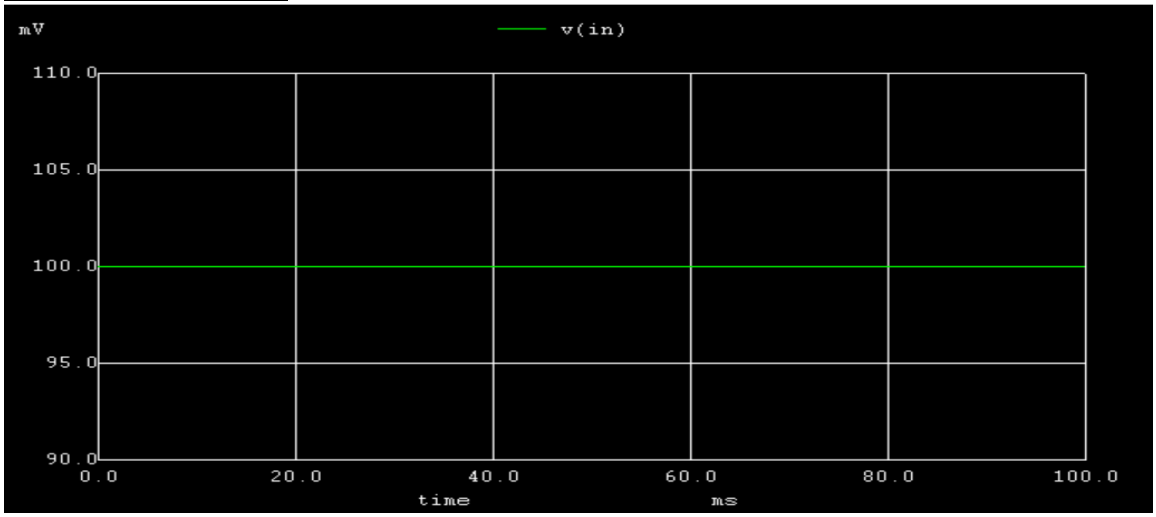
Introduction: The circuit which performs the mathematical operation of logarithm along with amplification is called as Logarithmic Amplifier. It produces an output proportional to the logarithm of the input. The op-amp is used in inverting configuration with diode in the feedback. The voltage across the diode is proportional to the logarithm of the current through it. Instead of a diode a transistor can also be used.

Logarithmic Amplifier Circuit Using Op-Amp with Transistor in the feedback.

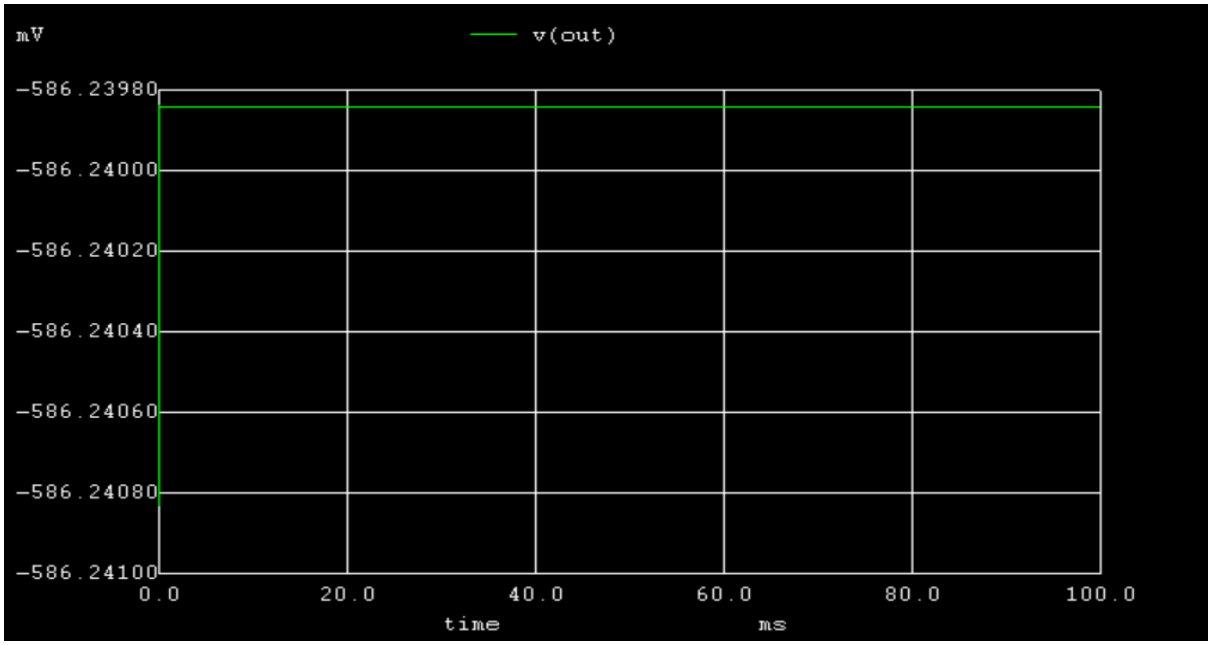
Schematic diagram:



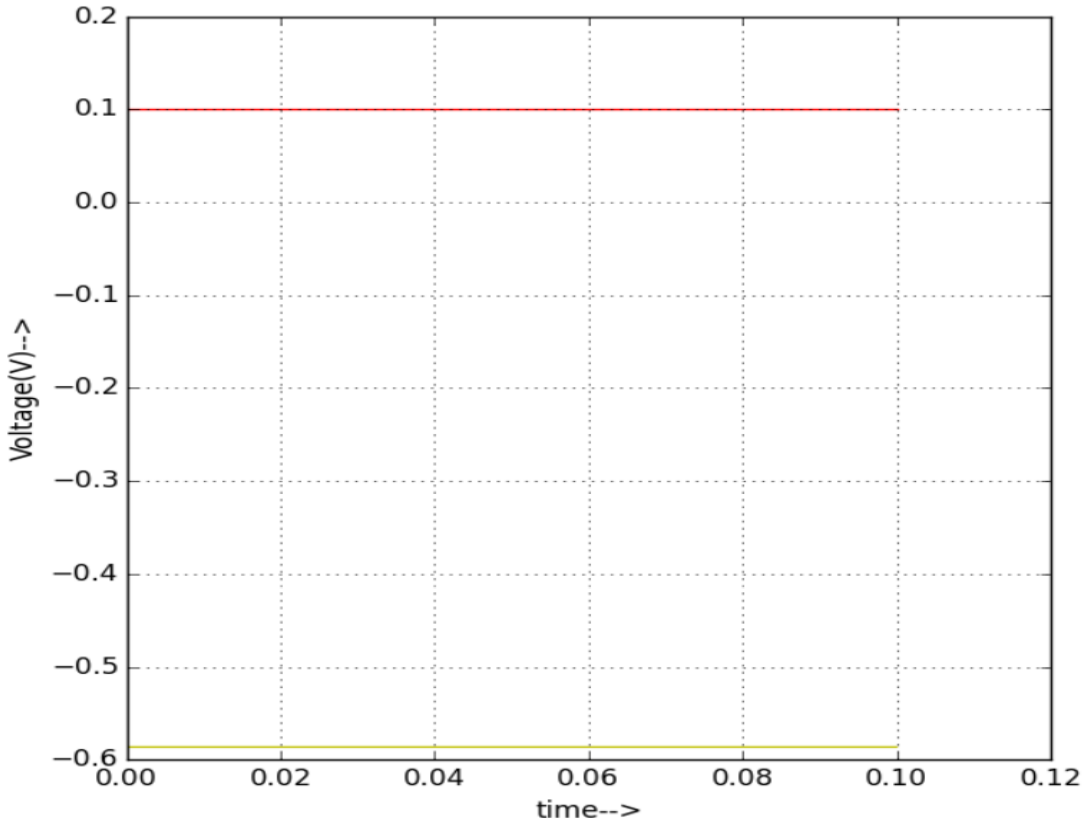
Simulation Results : Ngspice Plots- Input signal

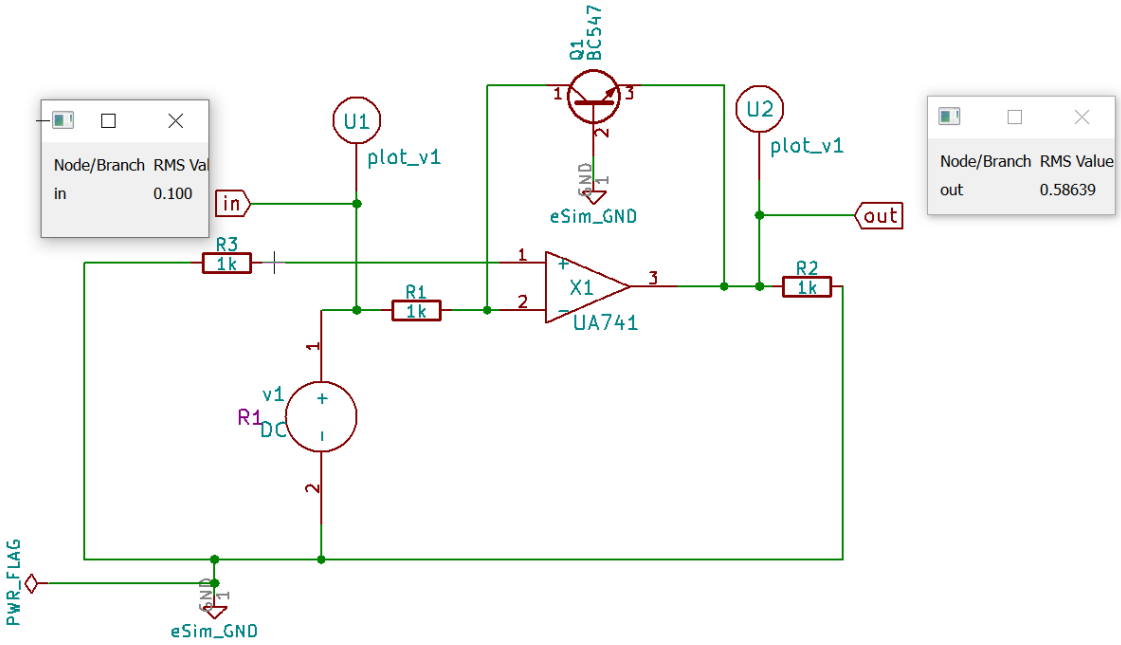


Ngspice Plots- Output signal



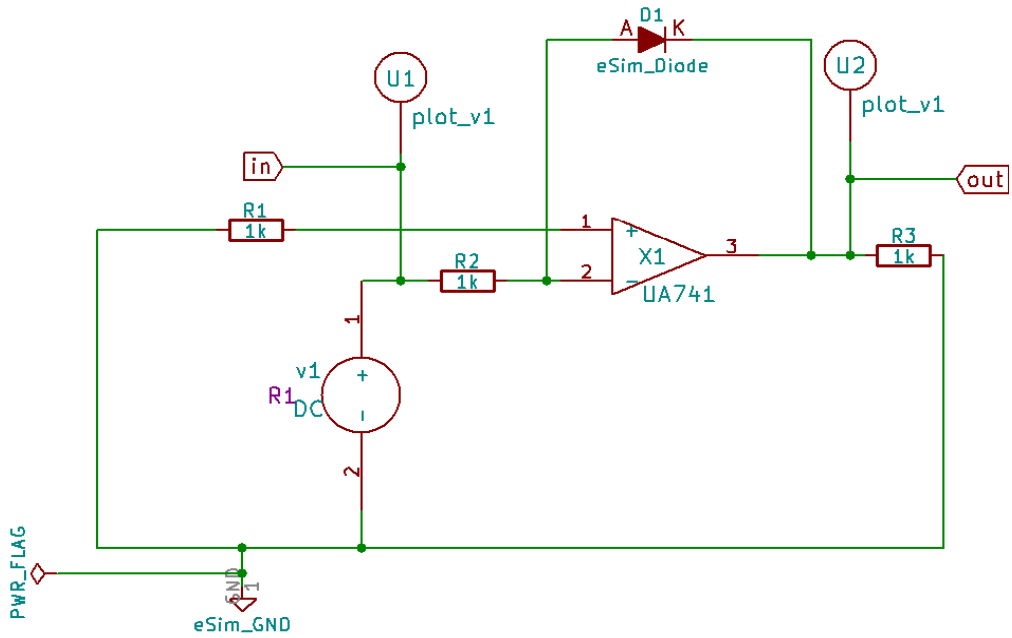
Python Plots - Input and Output signal overlapped





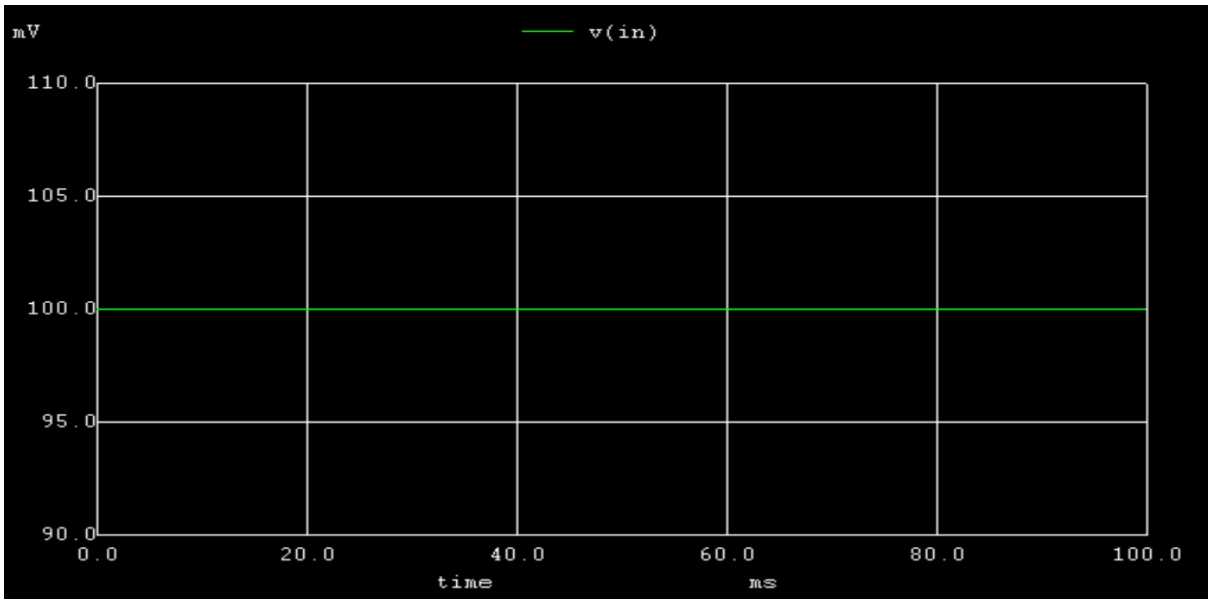
Logarithmic Amplifier Circuit Using Op-Amp with Diode in the feedback

Schematic diagram:

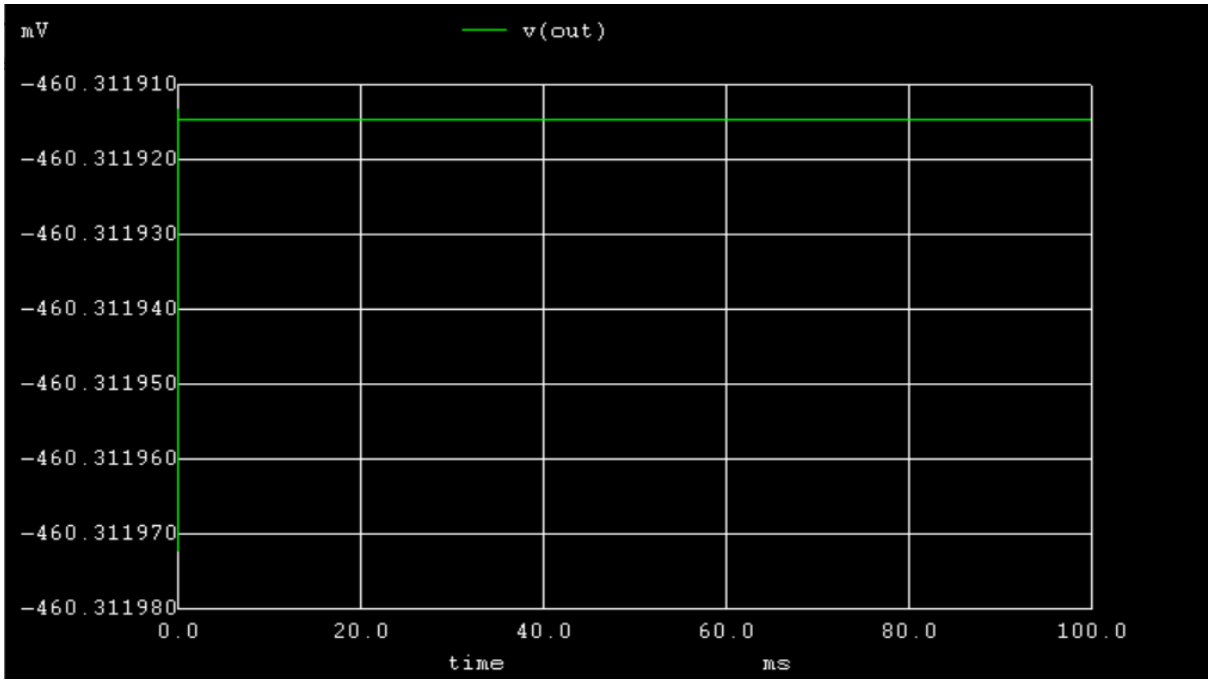


Simulation Results :

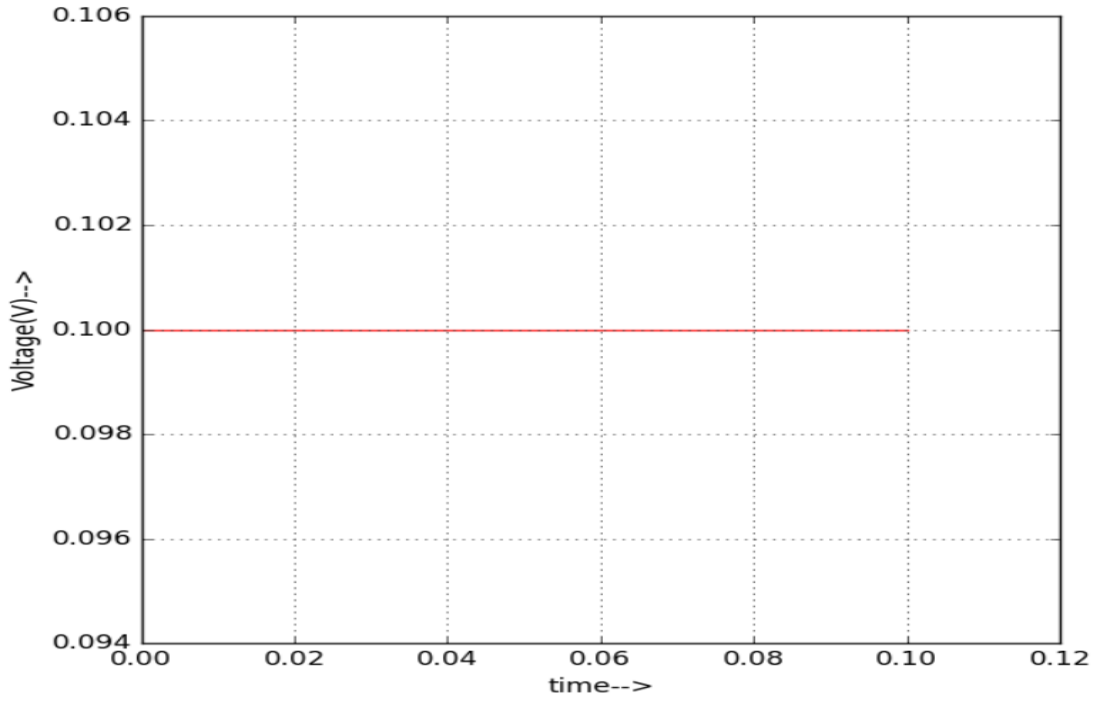
Ngspice Plots- Input signal



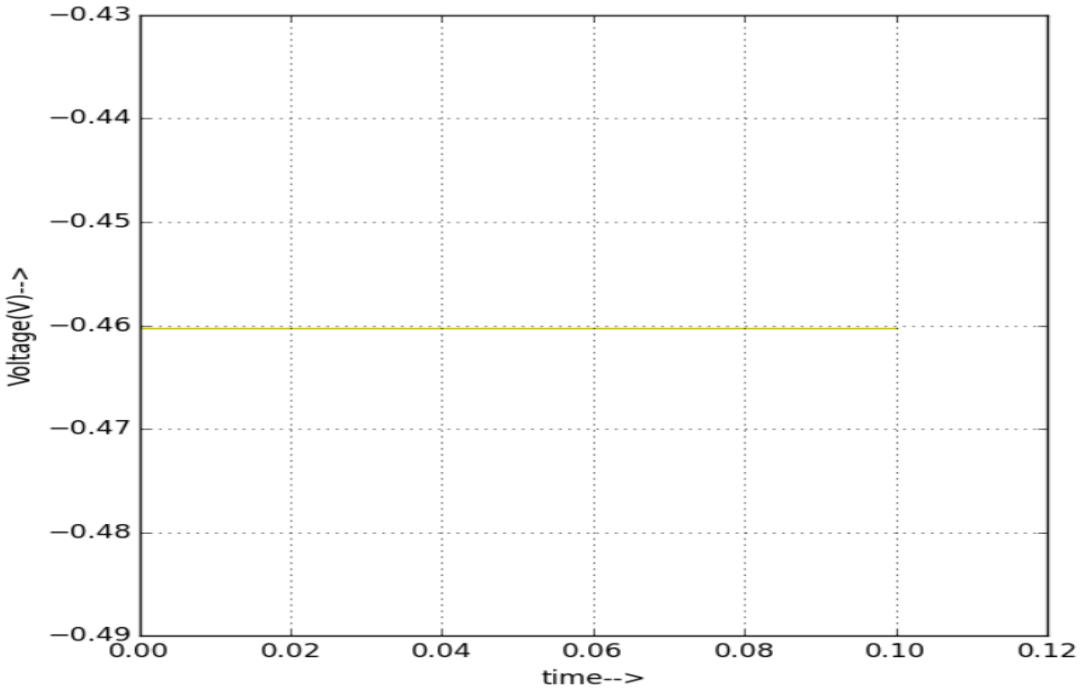
Ngspice Plots- Output signal



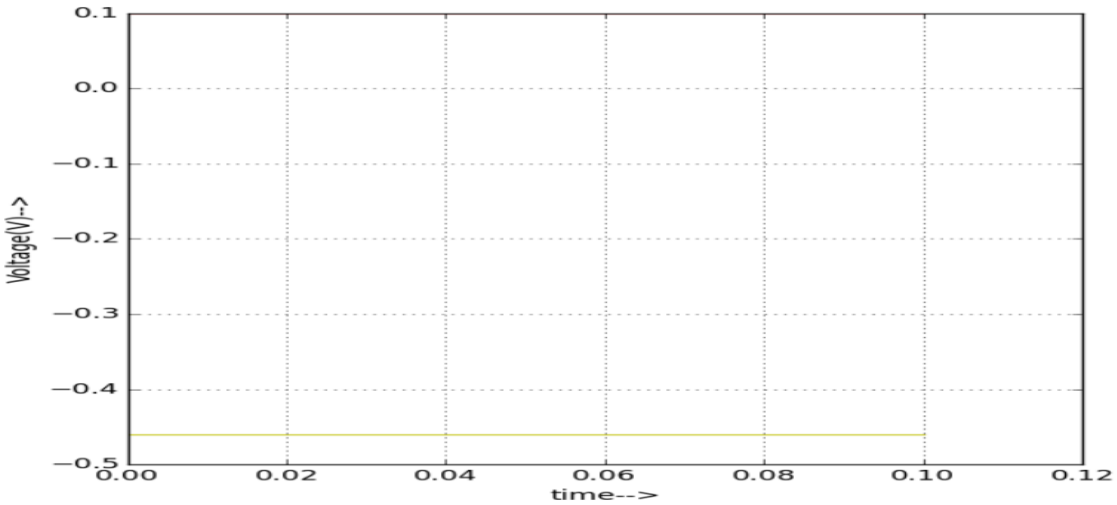
Python Plot - Input signal

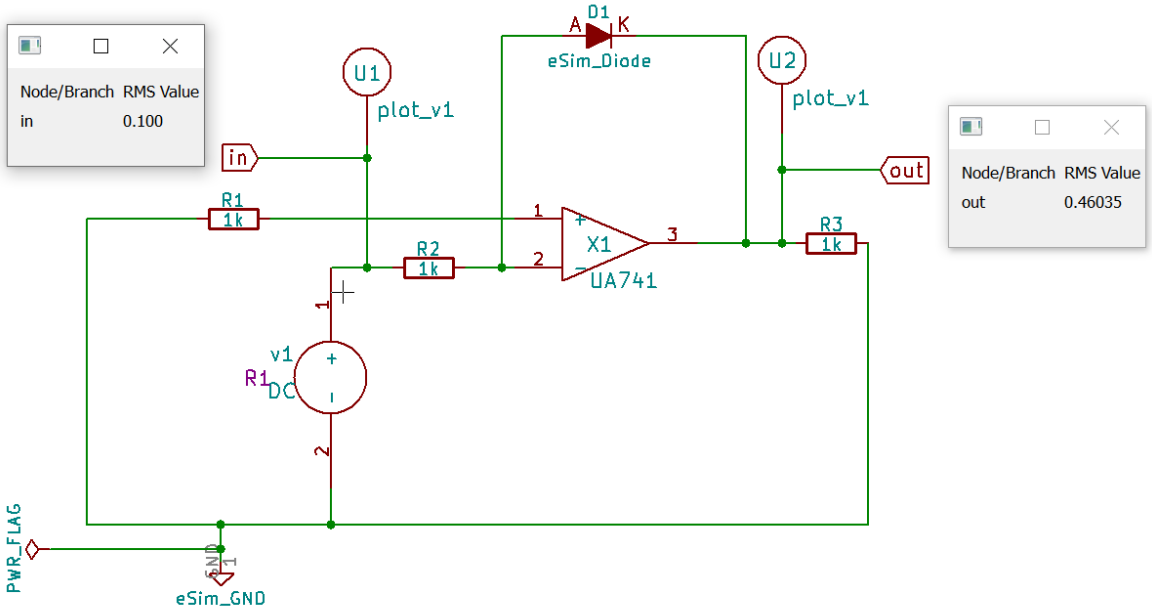


Python Plot - Output signal



Input and Output signal overlapped





Conclusion:

Logarithmic amplifier circuit using op-amp ua 741 was simulated using esim and appropriate waveforms were obtained.

References:

https://esim.fossee.in/resource/book/esimusermanual.pdf

https://www.youtube.com/watch?v=sq3_Fe_UkfA

https://www.tutorialspoint.com/linear_integrated_circuits_applications/linear_integrated_circuits_applications_log_and_anti_log_amplifiers.htm