Antilogarithmic Amplifier Circuit Using Op-Amp/Exponential Amplifier

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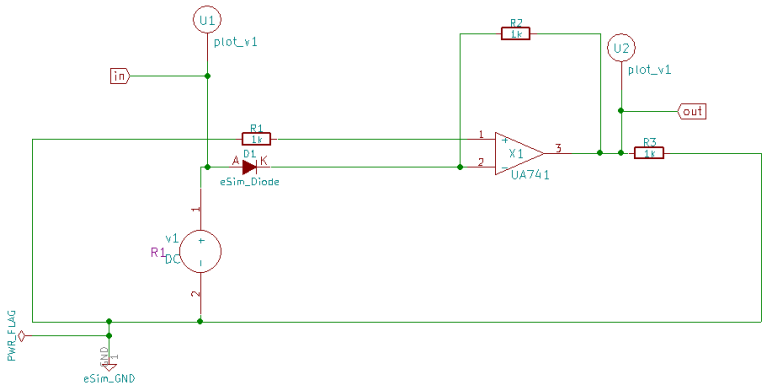
Introduction: An amplifier whose output voltage is the antilogarithm of the input voltage is called as antilogarithmic amplifier. Antilog is inverse operation of log operation so; antilog amplifiers can be designed by reversing the arrangement of diodes and resistors in the log amplifiers. It is important to note that a single polarity of current can only forward bias the diode. That means the antilog operation is single quadrant operation.

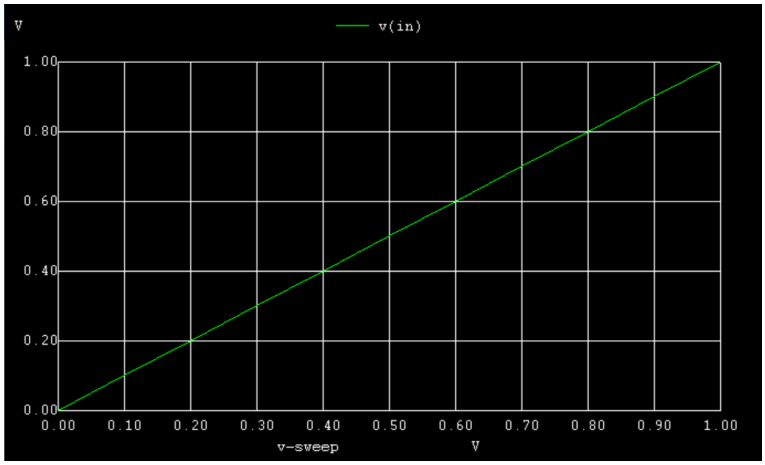
I. Diode based Logarithmic Amplifier

Schematic diagram:

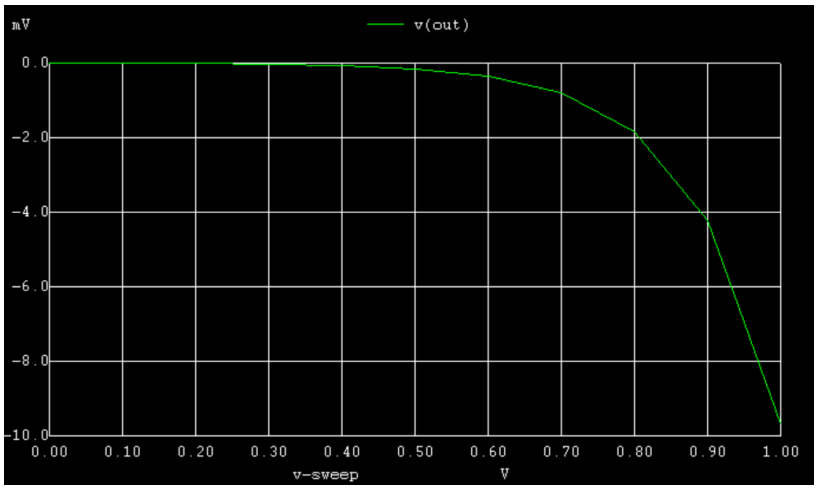


Simulation Results :

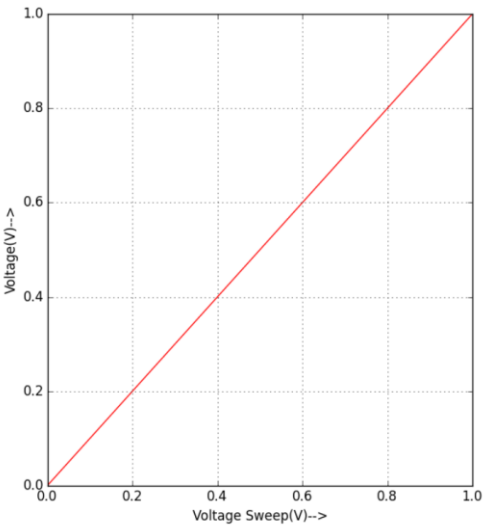
Ngspice Plots- Input signal



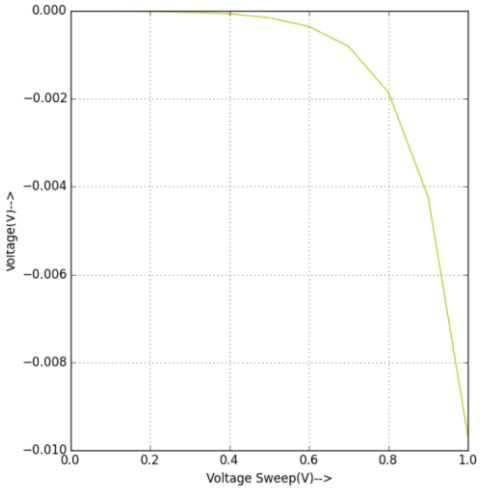
Ngspice Plots- Output signal



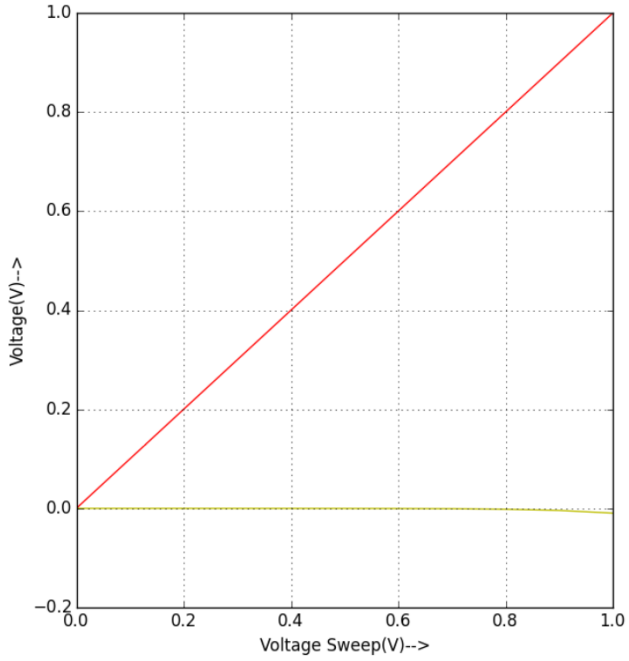
Python Plot - Input signal

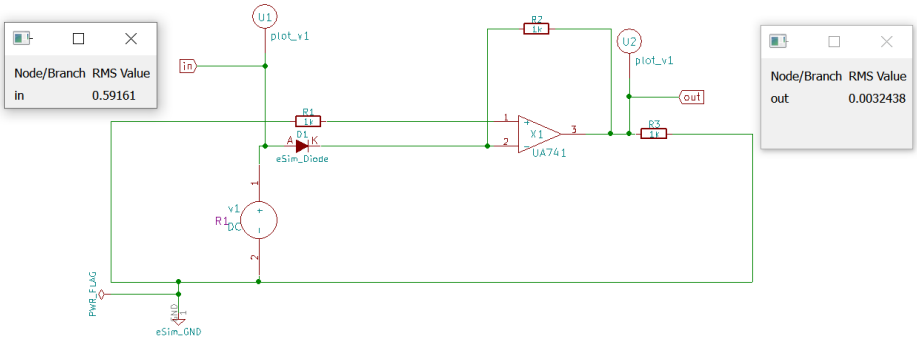


Python Plot - Output signal



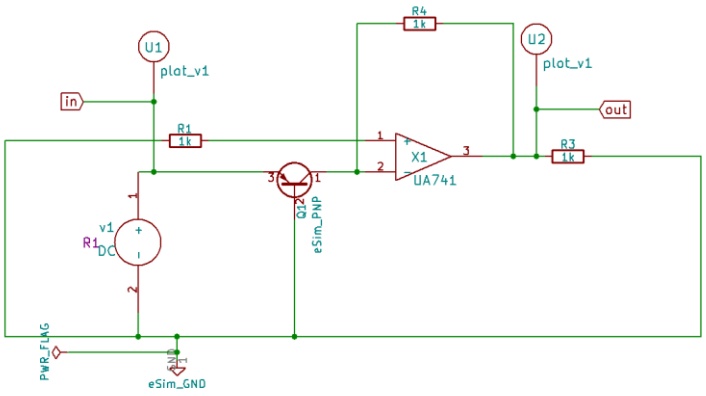
Input and Output signal overlapped





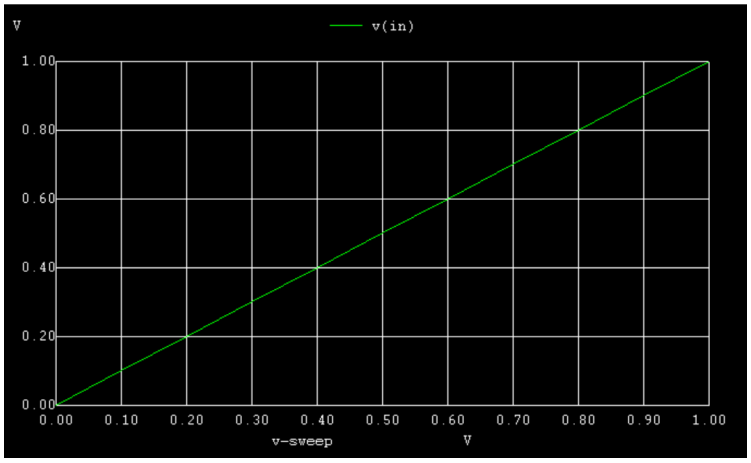
I. Transistor based Logarithmic Amplifier

Schematic diagram:

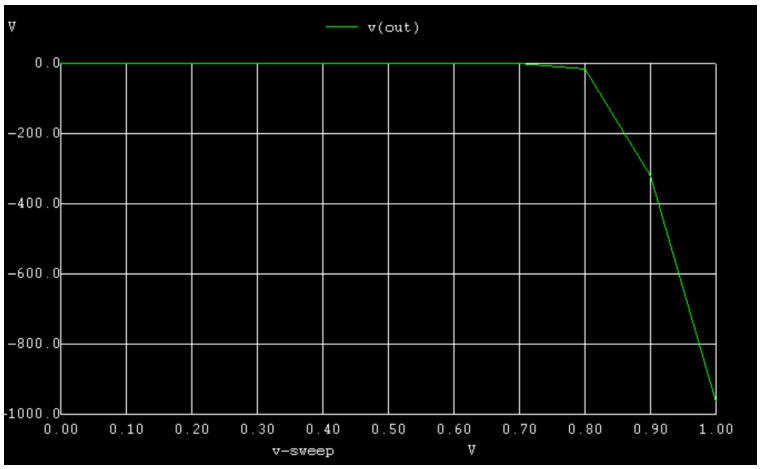


Simulation Results :

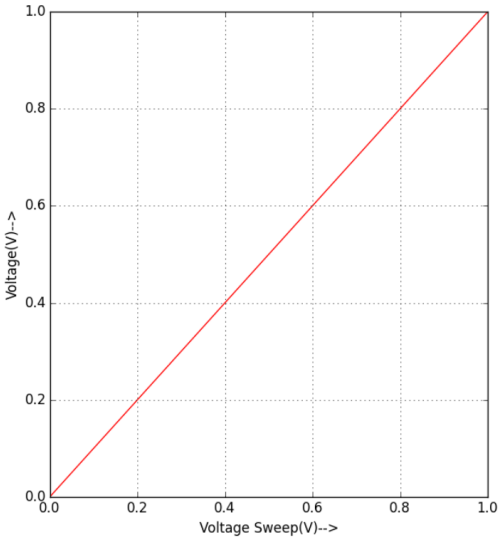
Ngspice Plots- Input signal



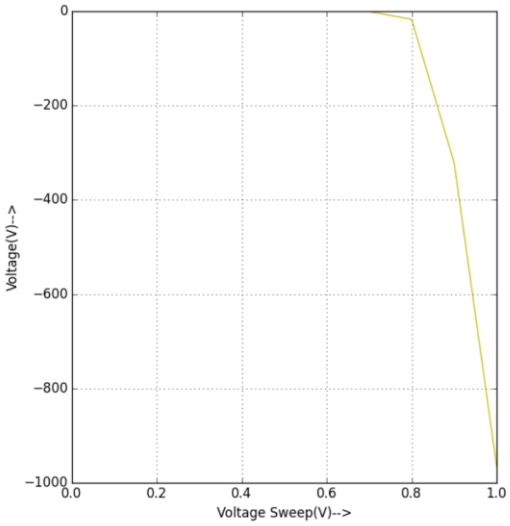
Ngspice Plots- Output signal



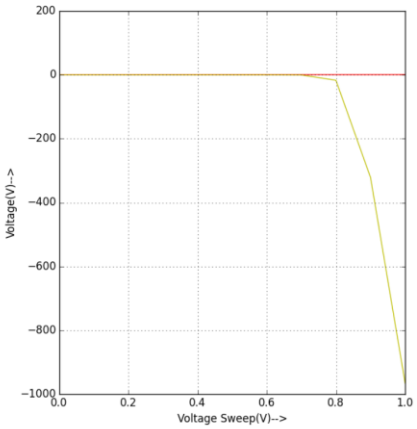
Python Plot - Input signal

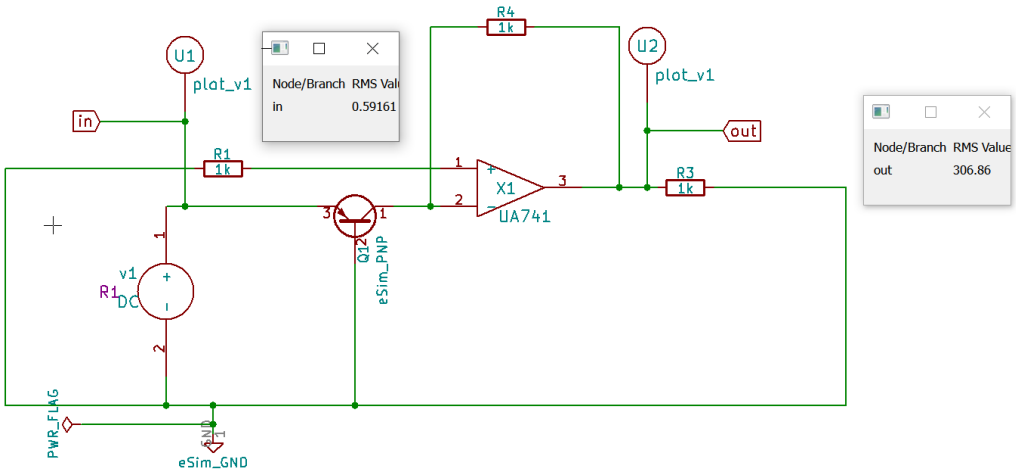


Python Plot - Output signal



Input and Output signal overlapped





Conclusion:

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

References:

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

https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/122106025/lec36.pdf