

CIRCUIT SIMULATION PROJECT

<https://esim.fossee.in/circuit-simulation-project>

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Title of the experiment : Simulation of Analog multiplier circuit using eSim.

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Theory:

An analog multiplier is a device that produces an output voltage or current that is proportional to the product of two or more independent input voltage or current. The analog multiplier is designed using log and antilog amplifier. A log amplifier can be constructed using a bjt in the feedback to the opamp. The output of log amplifier is dependent on the saturation current which varies from transistor to transistor and also with temperature. Antilogarithmic or exponential amplifier does the exact opposite operation of a log amplifier.

In analog amplifier the two inputs are given in the form of voltages to log amplifier respectively. The final output is $V_0 = kV_1 \cdot V_2$.

Circuit Diagram:

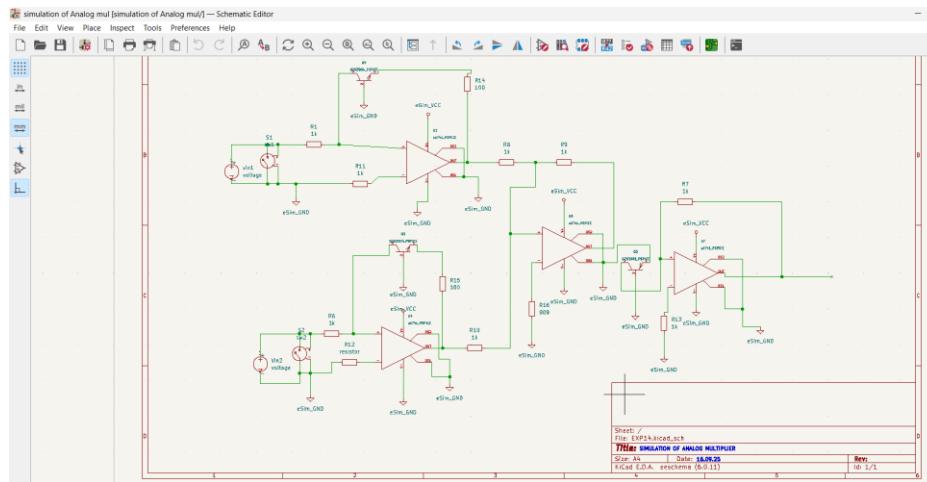
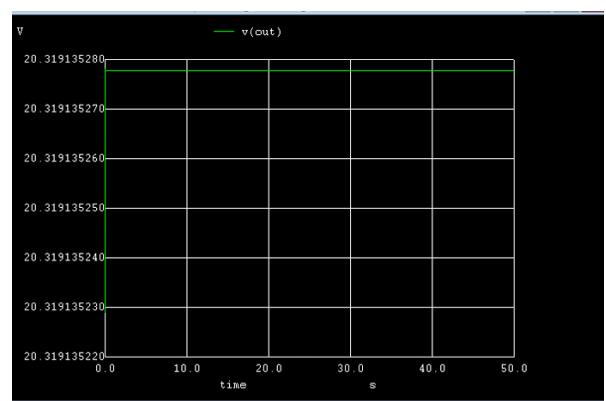
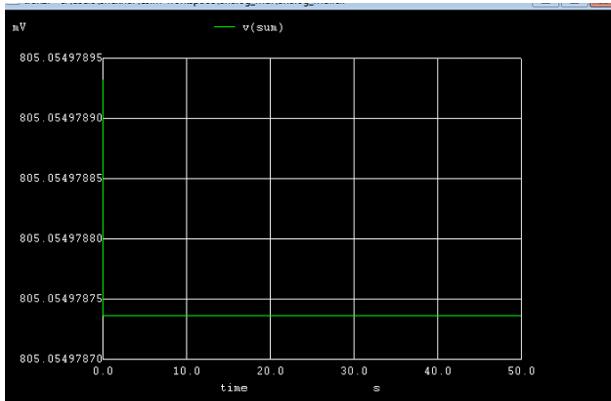
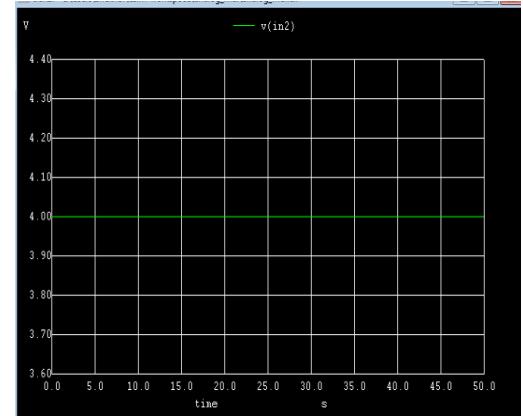
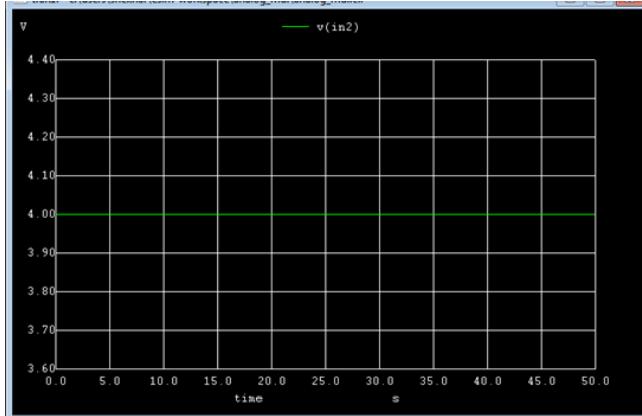


Figure 1: Analog Amplifier

Simulation results:

Ngspice plots:



Conclusion : Thus, we have studied the Analog multiplier using operational amplifier in eSim and we got the appropriate waveform and amplitude swing output.

References:

1. <https://www.electronicshub.org/operational-amplifier-applications/>
2. https://en.wikibooks.org/wiki/Electronics/Analog_multipliers