

Simulation and Analysis of an Inverting Operational Amplifier Using eSim

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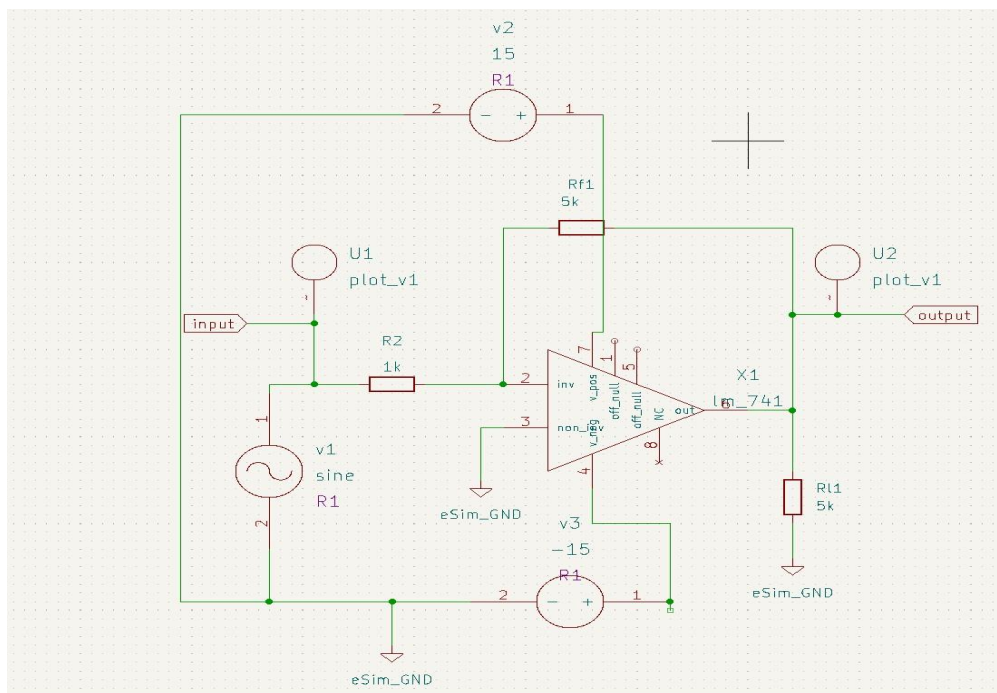
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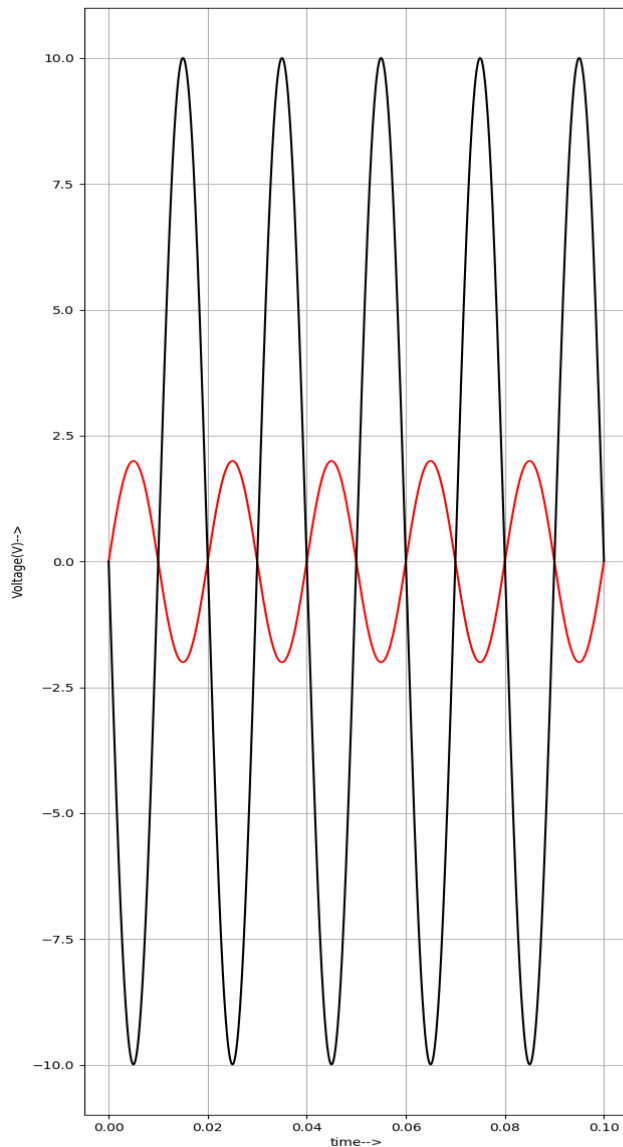
Theory :

Operational amplifiers (Op-Amps) are essential components in analog electronics, used for a wide range of applications, including signal conditioning, filtering, and mathematical operations. This project focuses on the design and simulation of an **Inverting Operational Amplifier** using the **eSim simulator**, an open-source electronic circuit design and simulation tool. The inverting op-amp configuration is known for providing a phase-inverted output with a controllable gain determined by external resistances. The objective of this project is to analyze the behavior of the circuit, verify theoretical calculations, and compare them with simulation results. An inverting op-amp configuration consists of an operational amplifier with the input signal applied to the inverting terminal (-) through a resistor, while the non-inverting terminal (+) is connected to the ground.

Circuit Diagram:



Result Obtained:



Conclusion

The simulation results confirmed that the inverting op-amp circuit functions as expected, with a gain and phase shift that match theoretical predictions. The use of eSim provided an effective platform for analyzing the circuit's behavior, reinforcing the practical understanding of operational amplifier applications.

References

1.Sedra, A. S., & Smith, K. C. (2015). *Microelectronic Circuits* (7th ed.). Oxford University Press.

