Circuit Simulation Project

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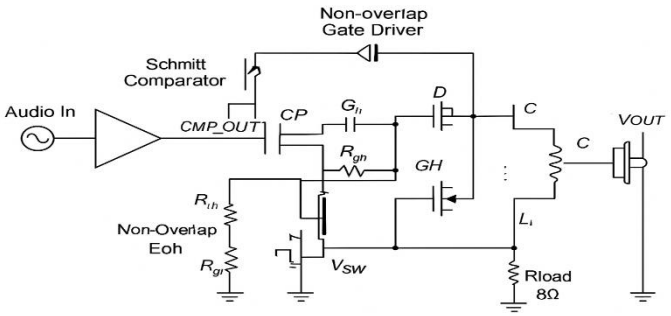
Title of Proposed Work:
Reproduction of a Self-Oscillating Class-D Audio Amplifier with Hysteretic Comparator and Post-Filter Feedback in eSim

Problem Statement:
Traditional linear amplifiers (Class A/AB) suffer from low efficiency (30–60%) and high heat dissipation, making them unsuitable for modern low-power and portable devices. Class-D amplifiers overcome these limitations by using high-frequency switching and pulse-width modulation (PWM) to achieve efficiencies greater than 85%.

Implementation Plan:

- Model hysteretic comparator using eSim blocks.
- Implement half-bridge switching stage using MOSFETs.
- Design LC output filter for audio band recovery.
- Apply post-filter feedback for stability and low distortion.
- Verify amplifier performance in eSim (efficiency, THD, switching frequency).



Reference:

Lu, J., & Gharpurey, R. (2011): *https://ieeexplore.ieee.org/document/5986758*

Analog Devices : https://www.analog.com/media/en/technical-documentation/application-notes/AN-1071.pdf