

RESEARCH MIGRATION PROJECT

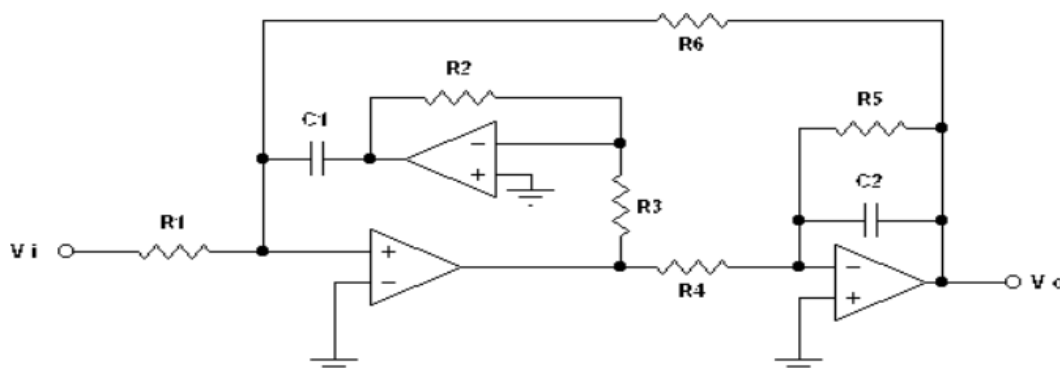
NAME- Adarsh Kumar

TITLE- Ackerberg-Mossberg Low Pass Filter

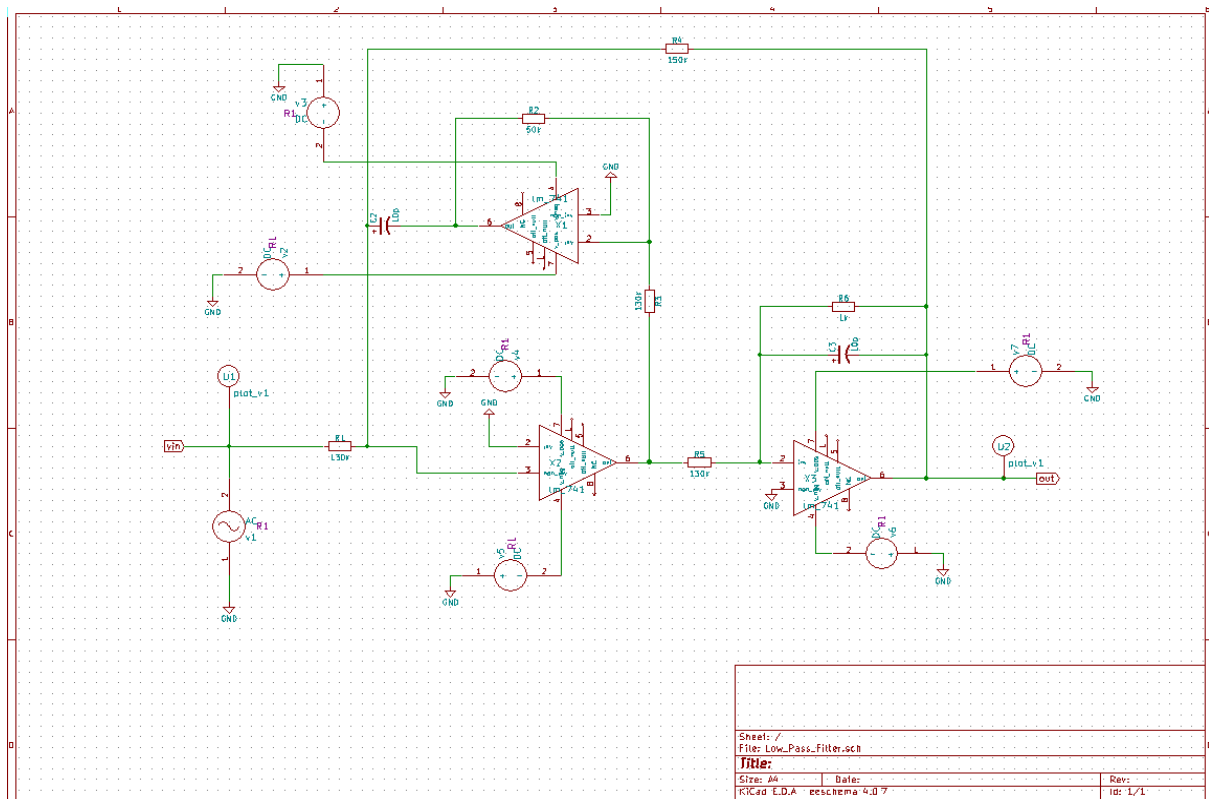
INTRODUCTION-

This paper details the design and simulation of an Ackerberg-Mossberg low-pass filter using the LM741 operational amplifier. The filter is designed to operate with a supply voltage of $\pm 15V$, and its performance is evaluated through simulation. The results include detailed waveforms and frequency response analysis, demonstrating the filter's ability to attenuate higher frequencies effectively while passing the lower frequencies. The LM741's behaviour is examined in the context of real-world operating conditions, providing insights into its suitability for low-pass filtering applications.

GOVERNING MODEL-

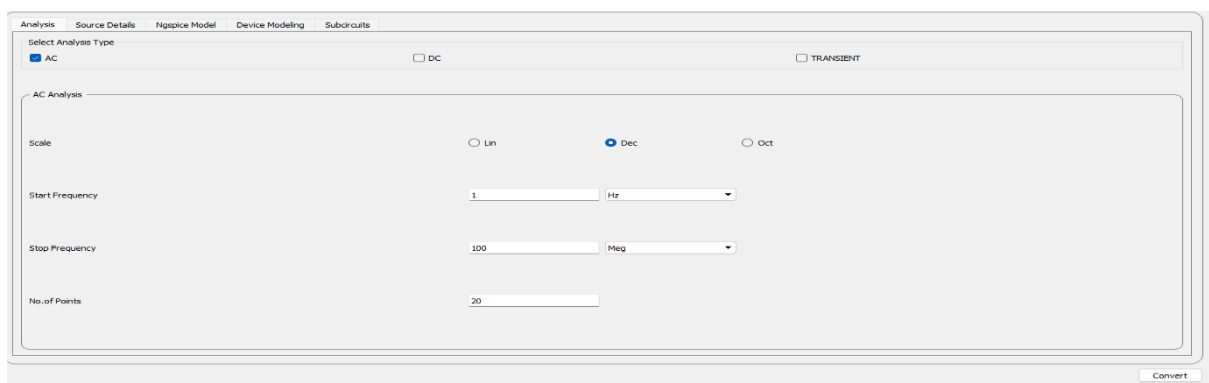


SCHEMATIC DESIGNED-



INPUTS-

- 1.All LM741 op-amps are provided with +/-15V.
- 2.An AC source is connected with amplitude of 10 Volts/Amps and 0 phase shift.



Analysis Source Details Ngspice Model Device Modeling Subcircuits

Add parameters for ac source v1
 Enter amplitude (Volts/Amps): 10
 Enter Phase Shift: 0

Add parameters for DC source v2
 Enter value (Volts/Amps): 15

Add parameters for DC source v3
 Enter value (Volts/Amps): 15

Add parameters for DC source v4
 Enter value (Volts/Amps): 15

Add parameters for DC source v6
 Enter value (Volts/Amps): 15

Add parameters for DC source v7
 Enter value (Volts/Amps): 15

Add parameters for DC source v5
 Enter value (Volts/Amps): 15

Convert

Analysis Source Details Ngspice Model Device Modeling Subcircuits

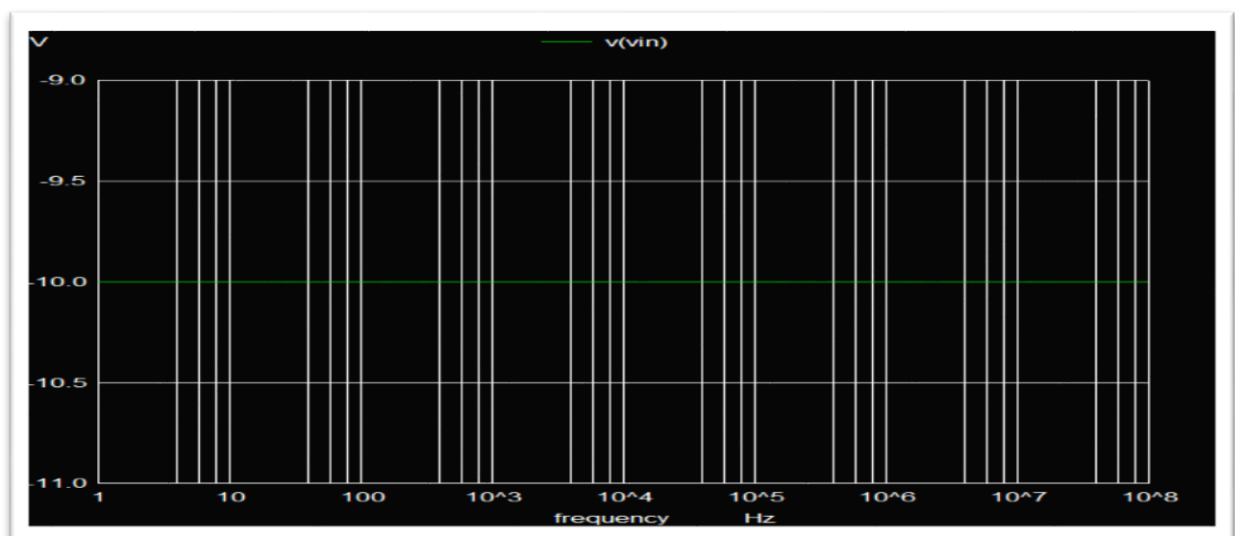
Add subcircuit for lm_741
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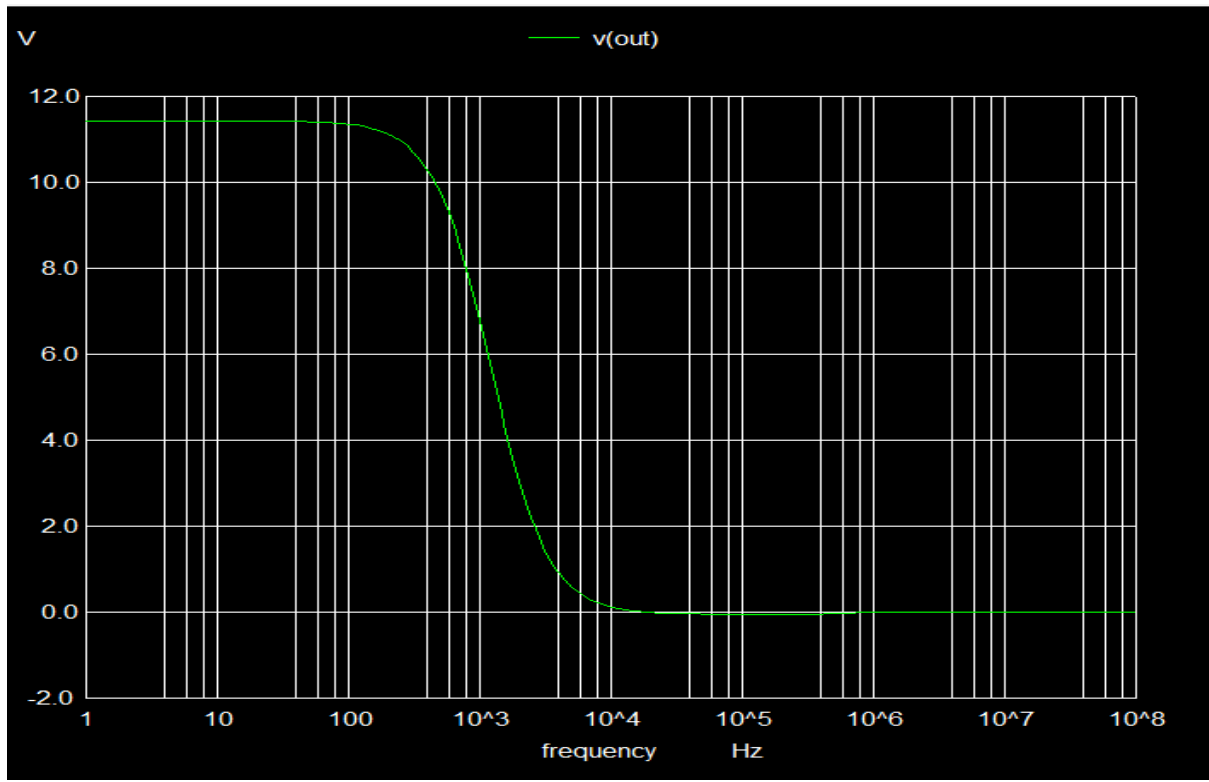
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Input waveform-



RESULT-

Output Waveform:



CONCLUSION-

Akerberg-Mossberg Low Pass Filter was designed and simulated using ESIM. design and simulation of the Akerberg-Mossberg low-pass filter using the LM741 operational amplifier successfully demonstrate the filter's effectiveness in attenuating high-frequency signals while allowing low frequencies to pass. Despite the limitations of the LM741, such as its finite bandwidth and slew rate, the filter meets the expected design specifications. This project highlights the LM741's viability for low-pass filtering tasks in various electronic applications.

REFERENCE-

1. https://www.researchgate.net/publication/270450021_Design_of_CMOS_Akerberg-Mossberg_Filters_Using_018mm_Technology
2. https://circuitsarchive.org/circuits/filters/second_order_lowpass/filter-akerberg-mossberg-am-second-order-lowpass-inverting/

