



*Electrical Engineering*  
**Indian Institute of Technology Hyd**  
**Analog Electronics**

February 10, 2024

Deadline: 18 Feb 2024

Assignment # 3

Maximum Marks: TBD

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**Instructions:**

1. Use LT spice software.
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1. Choose one of the opamps from the LT spice libraries

- a. Find the open-loop gain of the amplifier and -3dB bandwidth by plotting its frequency response.
- b. Find the input and output range of the omp in which it could be used as an amplifier without distroction.
- c. Calculate the slew rate of the opamp.
- d. Configure the opamp in negative feedback with to achieve the voltage gain of 10 and -10.
- e. Plot the frequency response of the systems designed in previous part and find the new -3dB BW.
- f. Design a practical integrator using the same opamp, used in the part a, for input signals with frequency ranging from 10 kHz to UGB frequency of the system. Plot the frequency response of the integrator. Please mind that for a practical integrator, the minimum frequency of the input signal must be at least 10 times than the cut-off frequency of the system. Choose the passive components wisely to achieve the proper response. Apply a square waveform to this integrator with a time period of 10 us and demonstrate the working of the integrator.
- g. Design a practical differentiator using the same opamp, used in the part a, for input signals with frequency ranging from DC to 10 kHz. To realized the system, keep a series resistor with the forward capacitor and keep a capacitor in parallel with feedback resistor.

Please mind that for a practical differentiator, the maximum frequency of the input signal must be at least 10 times lesser than the cut-off frequency of the system. Choose the passive components wisely to achieve the proper response. Plot the frequency response of the differentiator. Apply a sinusoidal waveform of 1 kHz to this system and demonstrate the working of the differentiator.