



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

23ECB202 – LINEAR INTEGRATED CIRCUITS

II YEAR/ III SEMESTER

UNIT 1 – OPAMP CHARACTERISTICS

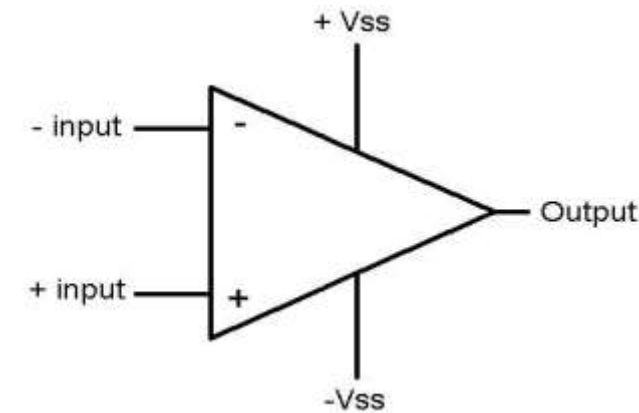
TOPIC 1- 4 – Ideal Op-Amp- Characteristics



Ideal Op-Amp- Characteristics



- An ideal op amp is an op amp that has perfect conditions to allow it to function as an op amp with 100% efficiency
- An ideal op amp will display the following characteristics
 - infinite voltage gain
 - infinitely high impedance
 - zero output impedance
 - gain is independent of input frequency
 - has zero voltage offset
 - output can swing positive or negative to the same voltages as the supply rails
 - output swings instantly to the correct value.
- In real life, as with all ideal components, an ideal op amp does not exist. However, if we can get an op amp to display as close as possible the characteristics of an ideal op amp as closely, we can make a more efficient op amp that has better output in real-world conditions
- Now we will go over all of these characteristics of an ideal op amp mentioned above, so that you can know what each is and so the difference between an ideal case and a real case. Below is a table that charts each of the major characteristics of an op amp and how they differ in ideal and real op amps.





Ideal Op-Amp- Characteristics



Characteristics	Ideal Op Amp	Real Op Amp
Infinite Voltage Gain	An ideal op amp will have infinite voltage gain.	A real op amp can only produce a finite gain.
<u>Infinitely high input impedance</u>	An ideal op amp will have infinitely high input impedance	A real op amp has finite input impedance
<u>Zero Output Impedance</u>	An ideal op amp will have zero output impedance	A real op amp will always have some output impedance
Gain Independent of Frequency	In an ideal op amp, the gain that the op amp produces will be independent of frequency	In real op amps, the gain that is produced is only for a certain bandwidth of frequencies
<u>Zero Input Voltage Offset</u>	In an ideal op amp, if no voltage is applied to the inverting and noninverting input pins, the op amp will output a voltage of 0	A real op amp will have slight offset even if the voltage applied to the pins are the same
Positive and Negative Voltage Swings to Supply Rails	In an ideal op amp, the ac voltage which is fed into the op amp to be amplified will swing all the way up for the DC positive supply rail and all the way down for the DC negative supply rail, making 100% efficient use of the DC voltage supplied to an op amp.	In real op amps, the amplified signal will not fully reach the DC supply rails. They will fall short of it.
Output swings instantly to the correct value	In an ideal op amp, the output will swing instantly to the amplified voltage value. There will be no time delay between the time the voltage is input into the op amp till the time it is output. It will all be instantaneous.	In real op amps, the amplified signal will take time to reach the fully amplified voltage value. This is determined by the slew rate of the op amp.



THANK YOU