



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



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

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

23ECB202 – LINEAR INTEGRATED CIRCUITS

II YEAR/ IV SEMESTER
₁

UNIT 2 – APPLICATIONS OF OPERATIONAL AMPLIFIERS

TOPIC – Clamper



Clamper



- A **clamper** is an electronic circuit that produces an output, which is similar to the input but with a shift in the DC level.
- In other words, the output of a clamper is an exact replica of the input.
- Hence, the peak - to - peak amplitude of the output of a clamper will be always equal to that of the input.
- Clampers are used to introduce or restore the DC level of input signal at the output.



TYPES



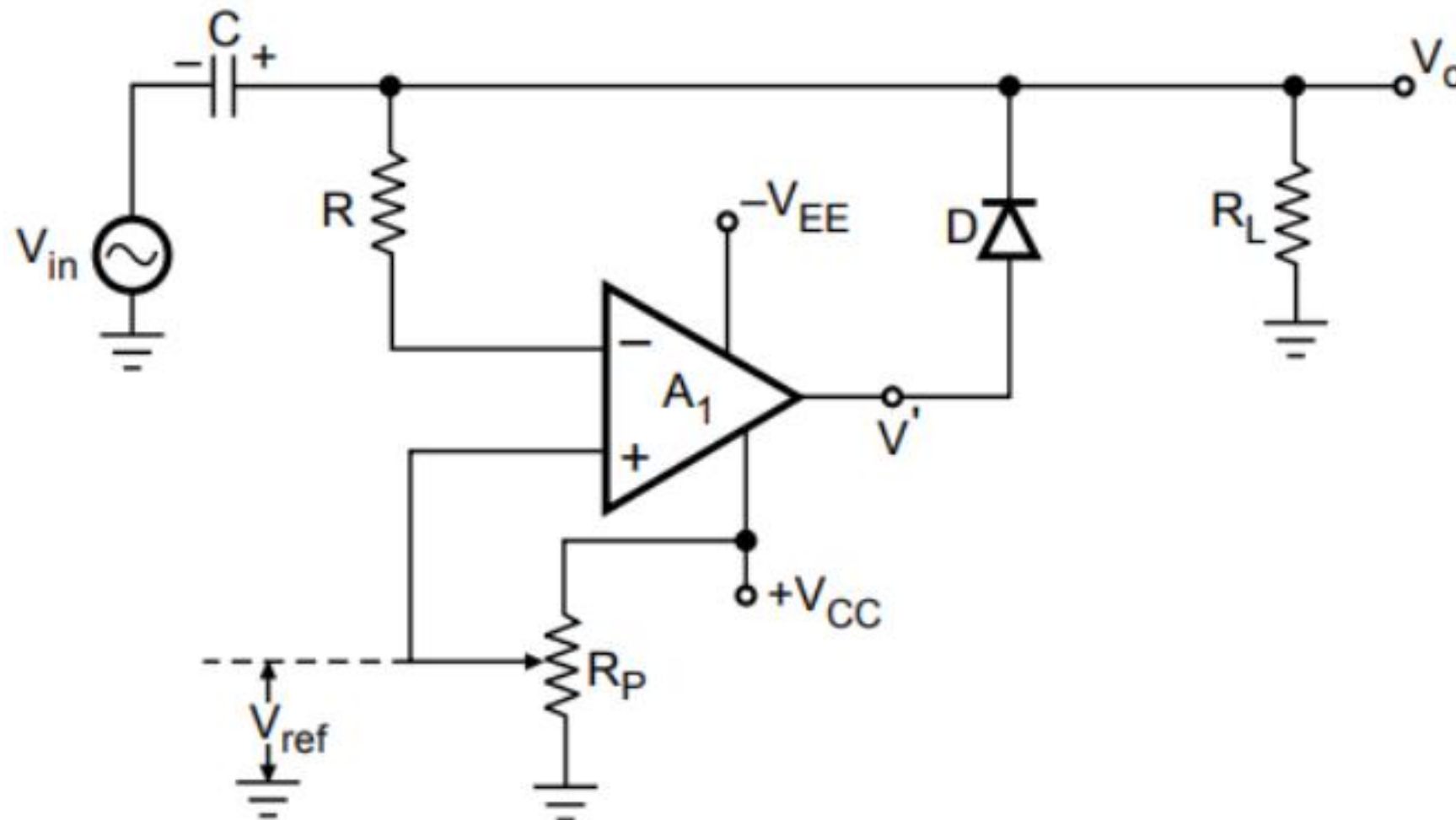
There are two types of op-amp based clampers based on the DC shift of the input.

- Positive Clamper
- Negative Clamper



Positive Clamper

- A positive clamper is a clamper circuit that produces an output in such a way that the input signal gets shifted vertically by a positive DC value.





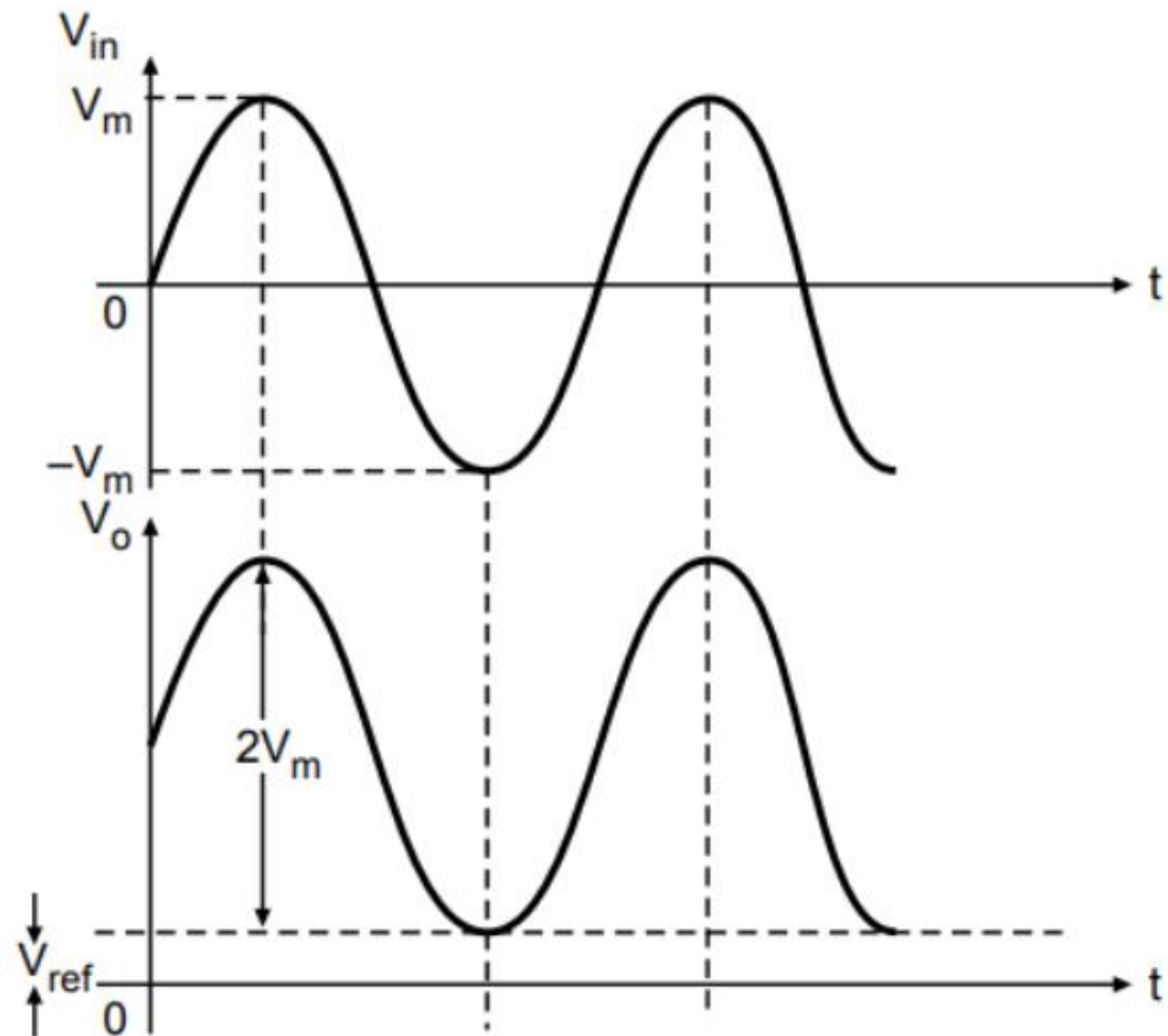
Working



- V_{ref} – applied to the (+) input terminal.
- For positive reference voltage v' is also positive.
- Diode D is forward biased – circuit operates as voltage follower $V_o = V_{ref}$
- If $V_i = V_m \sin \omega t$ applied to (-) input terminal.
- During negative half cycle, Diode conducts – Capacitor charges through diode to the negative peak voltage V_m .
- During Positive half cycle, Diode is reverse biased – capacitor retains its previous voltage V_m
- Output voltage = $V_i + V_m$
- Total output voltage = $V_{ref} + V_i + V_m$.
- Resistor is used for protecting the op-amp against excessive discharge currents from capacitor C1 especially when the dc supply voltages are switched off.



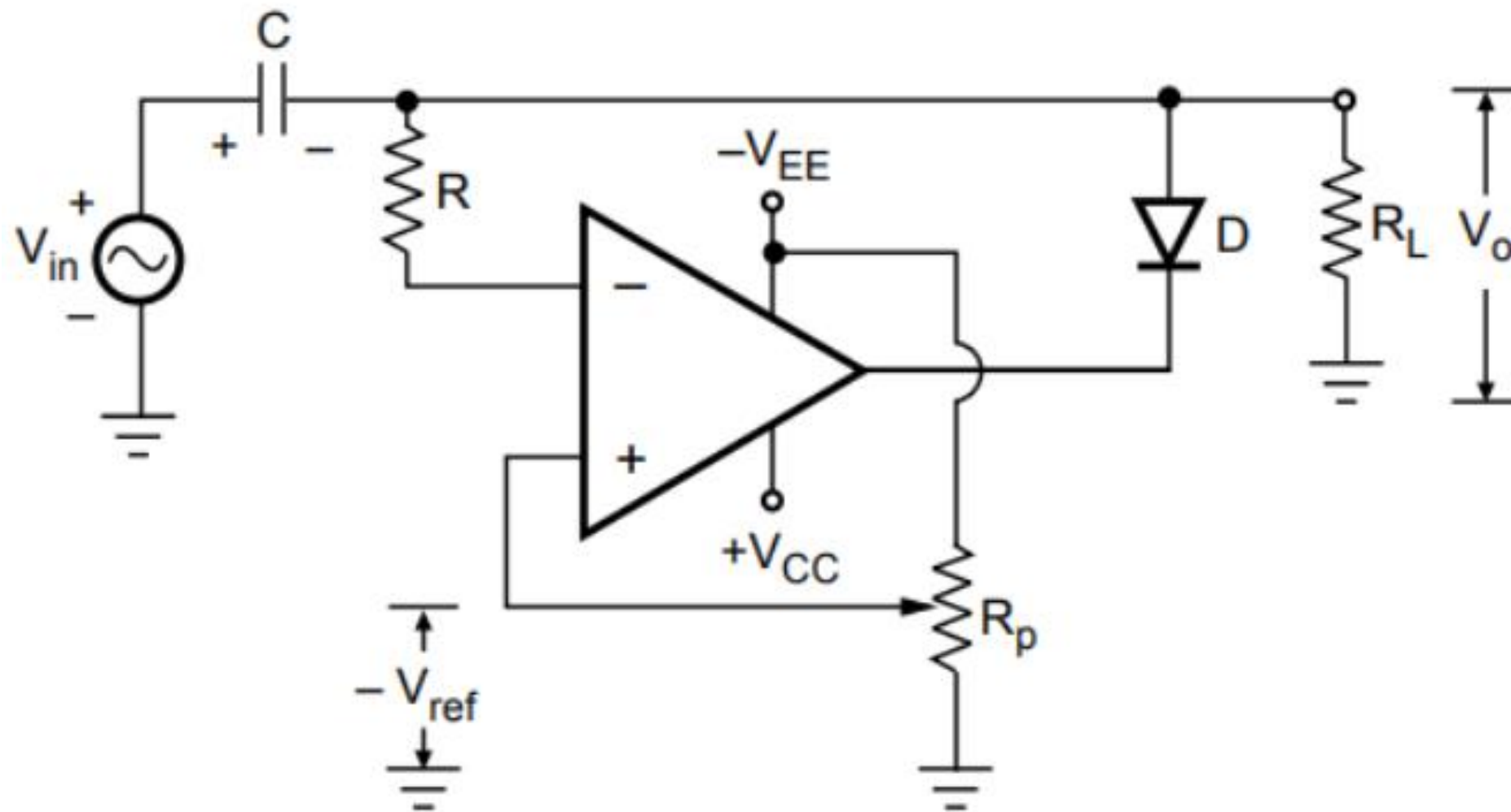
Waveforms





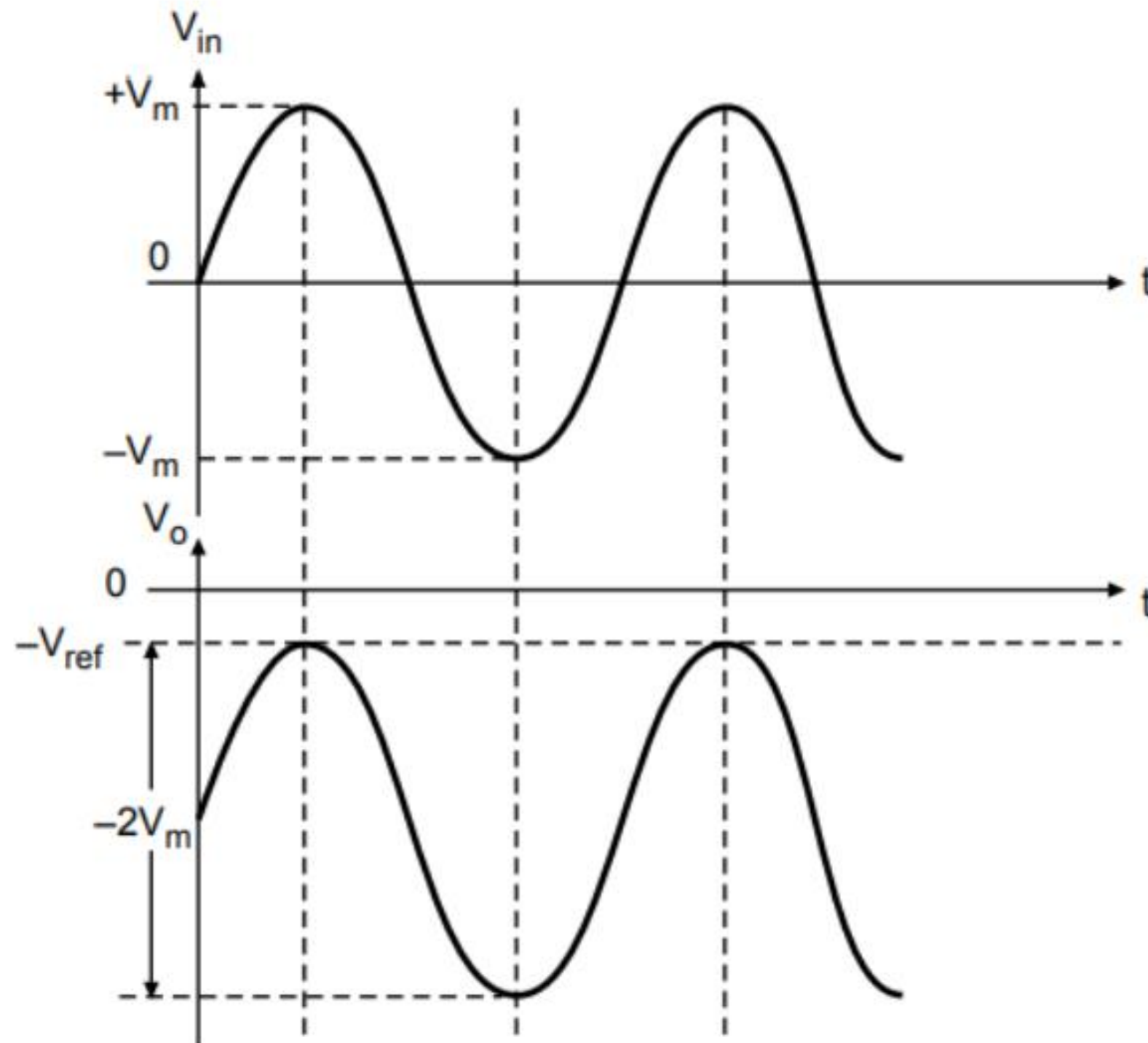
Negative Clamper

- A **negative clamper** is a clamper circuit that produces an output in such a way that the input signal gets shifted vertically by a negative DC value.





Waveforms





Assessment



1. An op-amp clamper circuit is also referred as
 - a) DC cutter
 - b) DC inserter**
 - c) DC lifter
 - d) DC leveller



2. A circuit with a predetermined dc level is added to the output voltage of the op-amp is called
 - a) Clamper**
 - b) Positive clipper
 - c) Halfwave rectifier
 - d) None of the mentioned



THANK YOU