

Circuit Simulation Project

<https://esim.fossee.in/circuit-simulation-project>

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Title of the circuit : POSITIVE CLAMPER WITH POSITIVE AND NEGATIVE VR

Theory/Description :

A clamper is an electronic circuit that changes the DC level of a signal to the desired level without changing the shape of the applied signal. In other words, the clamper circuit moves the whole signal up or down to set either the positive peak or negative peak of the signal at the desired level.

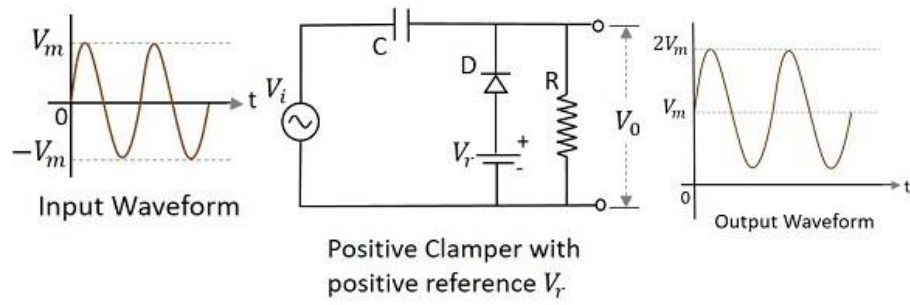
The dc component is simply added to the input signal or subtracted from the input signal. A clamper circuit adds the positive dc component to the input signal to push it to the positive side. Similarly, a clamper circuit adds the negative dc component to the input signal to push it to the negative side.

A Clamping circuit restores the DC level. When a negative peak of the signal is raised above to the zero level, then the signal is said to be **positively clamped**.

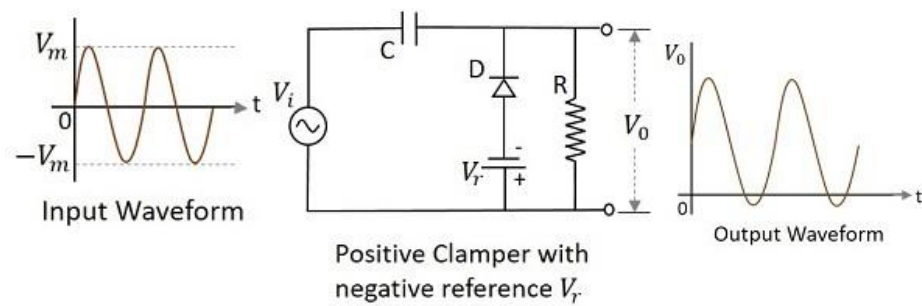
A Positive Clamper circuit is one that consists of a diode, a resistor and a capacitor and that shifts the output signal to the positive portion of the input signal. The figure below explains the construction of a positive clamper circuit.

The output signal changes according to the changes in the input, but shifts the level according to the charge on the capacitor, as it adds the input voltage.

Positive Clamper with Positive V_r



Positive Clamper with Negative V_r



Circuit Diagram(s) :

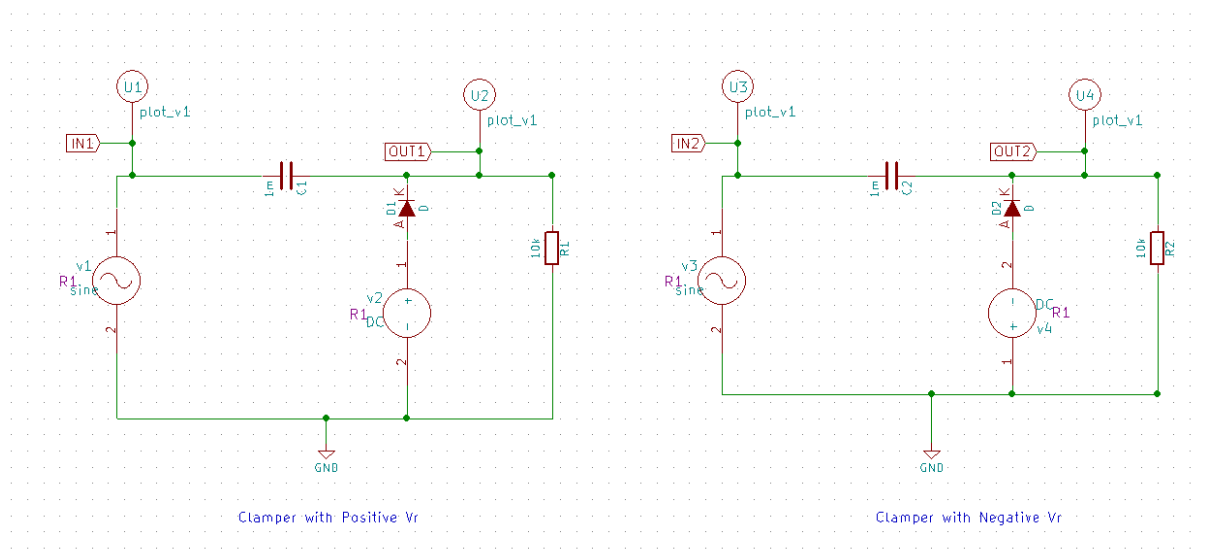


Figure 1: Schematic diagram of positive clamper with positive V_r (on left) and negative V_r (on right).

Results (Input, Output waveforms and/or Multimeter readings) :

NgSpice Plots:

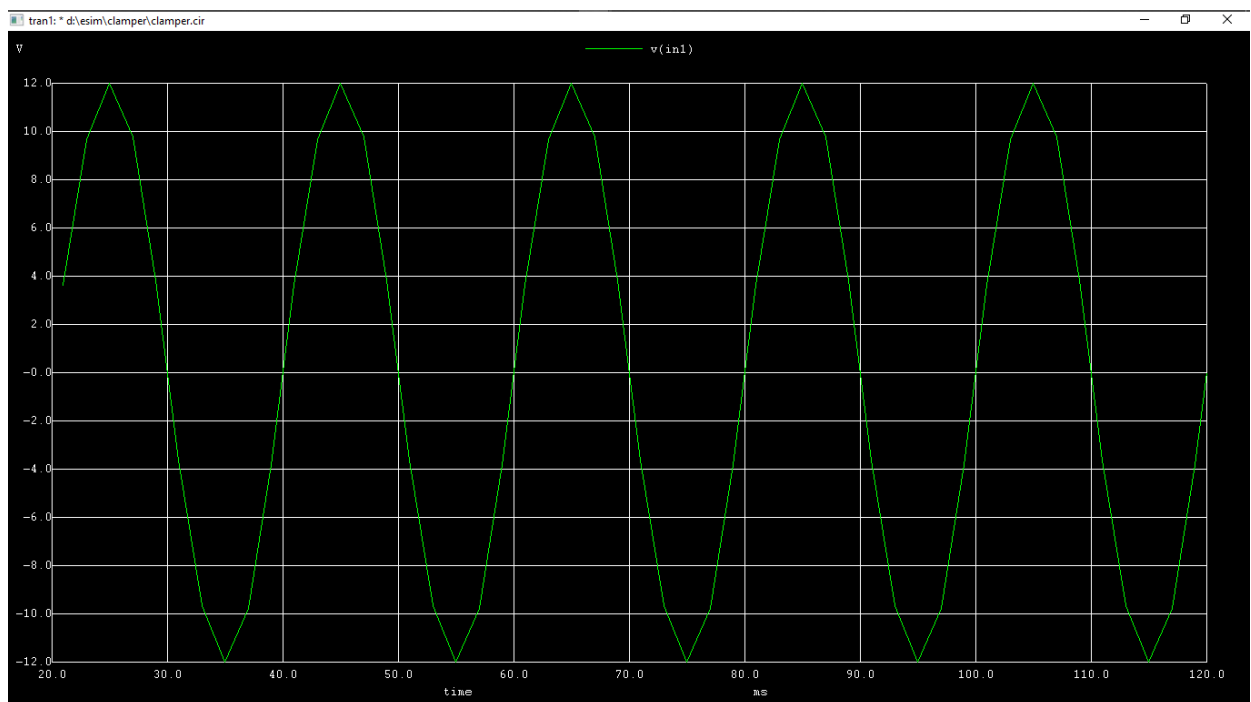


Figure 2: ngspice input 1 plot

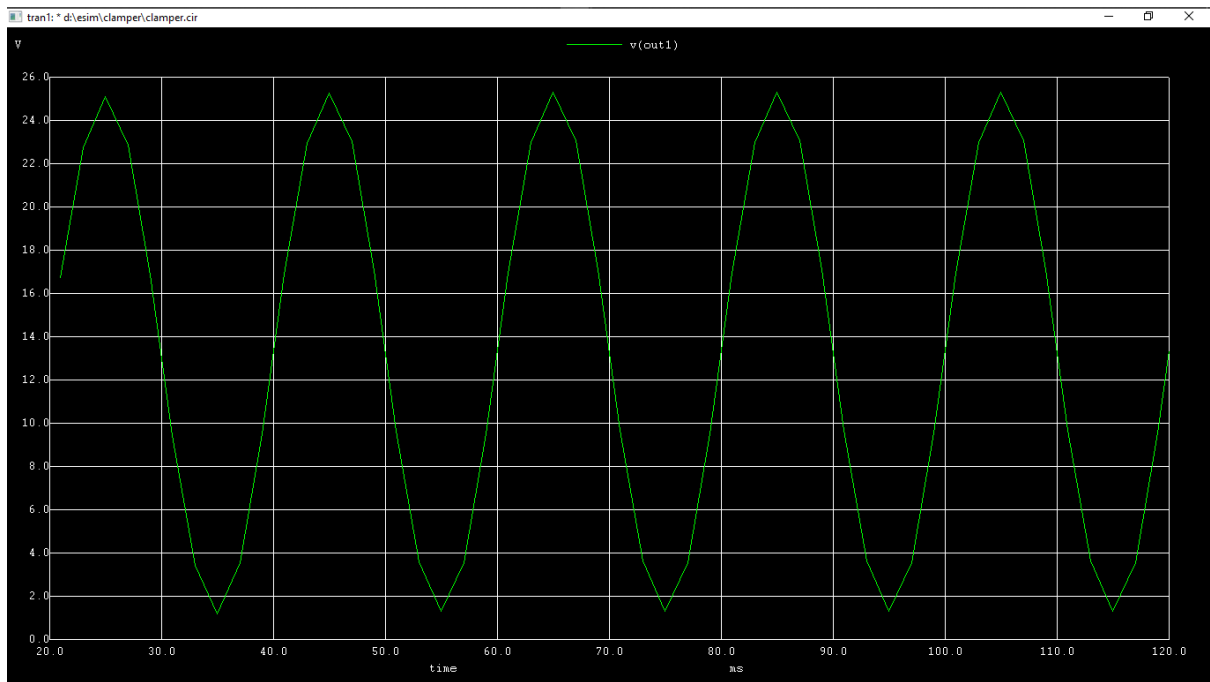


Figure 3: ngspice output 1 plot

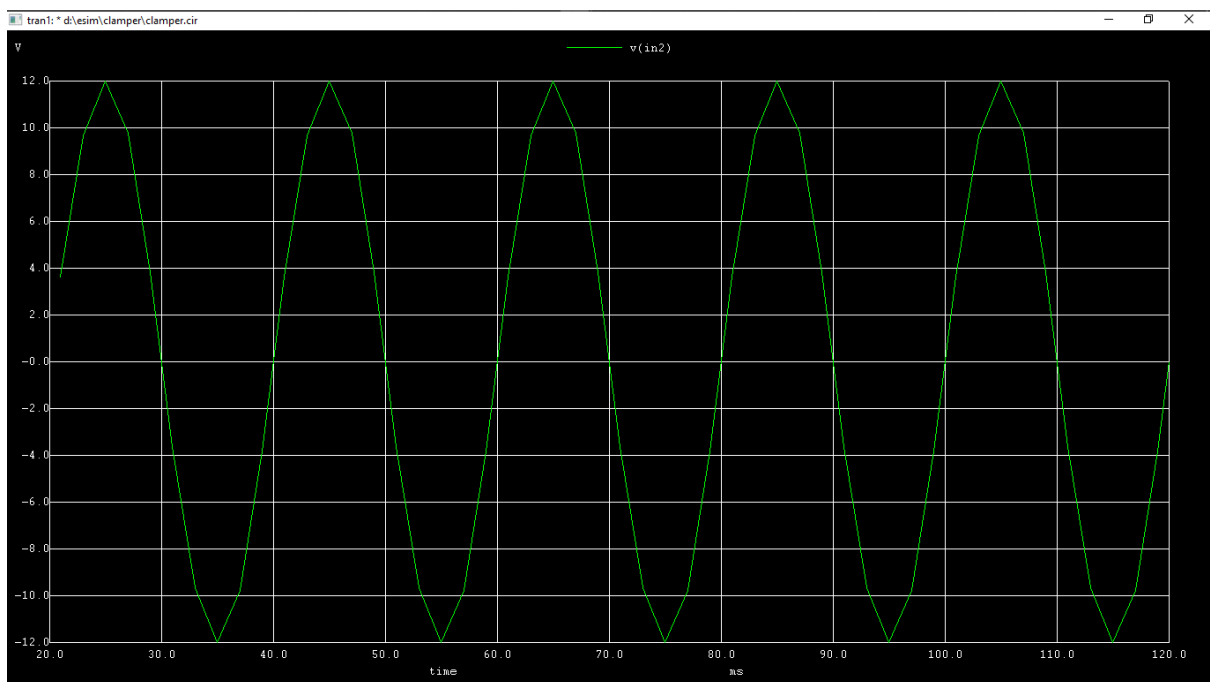


Figure 4: ngspice input 2 plot

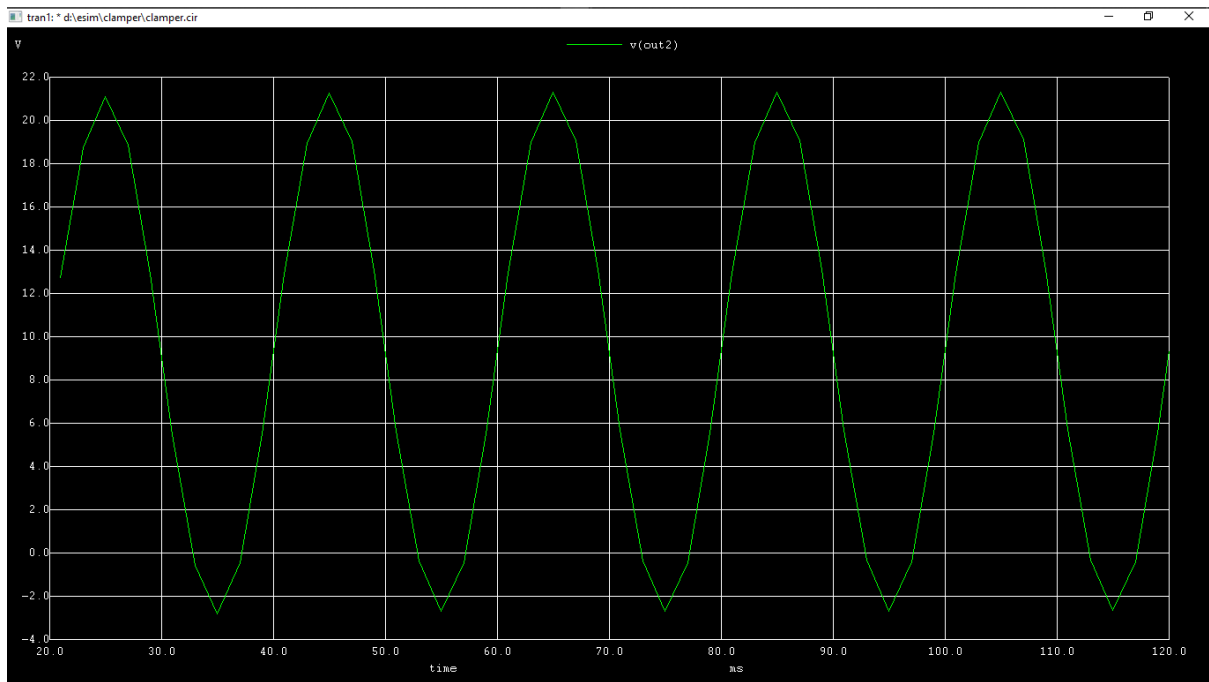


Figure 5: ngspice output 2 plot

PYTHON PLOT

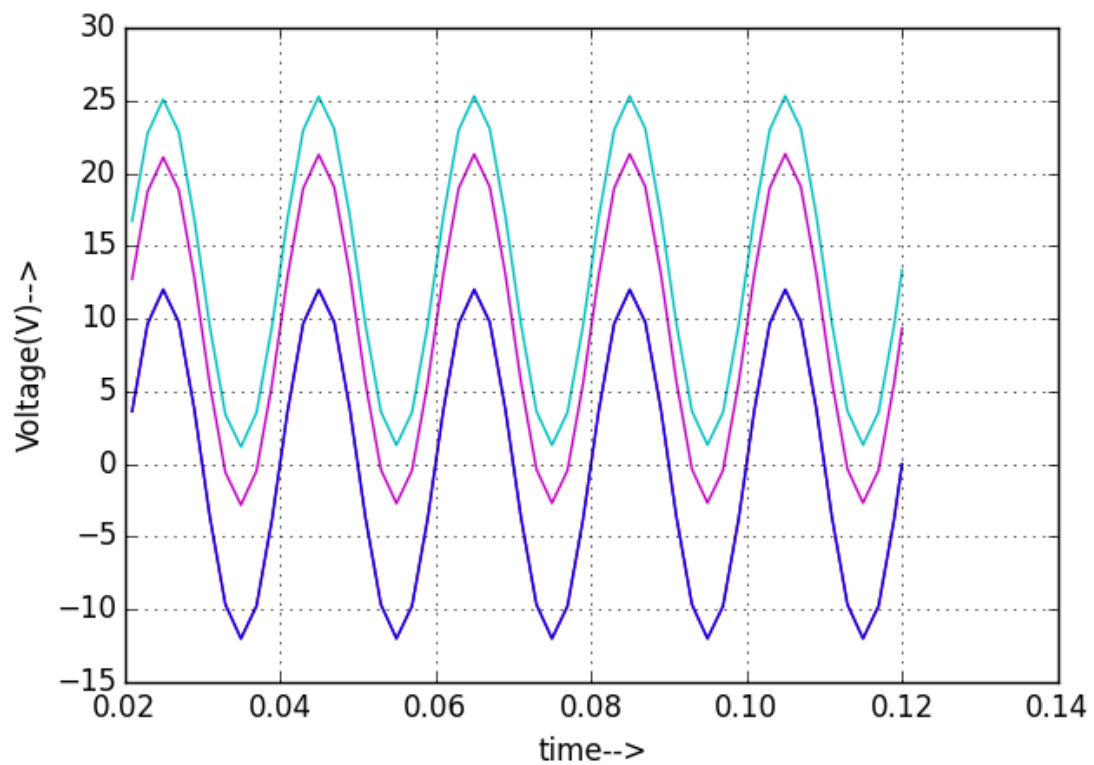


FIGURE 6:

Input :dark blue ;

Clamped (output with $V_r=+2$):light blue;

Clamped output (with $V_r=-2$):purple

Source/Reference(s) :

- https://www.tutorialspoint.com/electronic_circuits/electronic_clamper_circuits.htm
- <https://www.physics-and-radio-electronics.com/electronic-devices-and-circuits/rectifier/clampercircuits.html>