Circuit Simulation

by
Mr. Sanket Taile
4th Sem Electrical Engineering,
Yeshwantrao Chavan College of Engineering, Nagpur

Guided By
Prof. Akshay Kadu, Prof. Nivedita Padole,
akshaykadu001@gmail.com, niveditapande1@gmail.com
Assistant Professor
Department Of Electrical Engineering
Yeshwantrao Chavan College of Engineering, Nagpur

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

Title:

Series Diode Positive limiting circuit.

Theory/Description:

Basically, nonlinear waveshaping circuit are classified into two types clipping circuit and clamping circuit. Clamping circuit play a role in energy storage therefore capacitor and inductor are involved in circuit building. In case of clipper circuit there is no role of energy storage therefore resistor and diode generally used to build a clipper circuit. In this work a basic parallel diode positive limiting circuit is used to simulate in esim software.

In this circuit a diode is connected in parallel with the DC source which limits only positive half cycle of the input supply. A constant DC reference is provided so as to limit   the positive half of the supply signal.
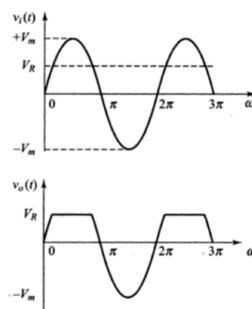

Fig. No. 1 Waveform of positive slicing operation

As shown in figure Vi(t) is the input sinusoidal waveform, V_R is the constant reference waveform and Vo(t) is the output waveform. Vo(t) is not allowed to exceed beyond V_R. A parallel diode circuit can perform the limiting operation. The mathematical expression for the output signal will be written as

$$V_0(t) = V_i(t) \quad for \quad V_i(t) \leq V_R$$

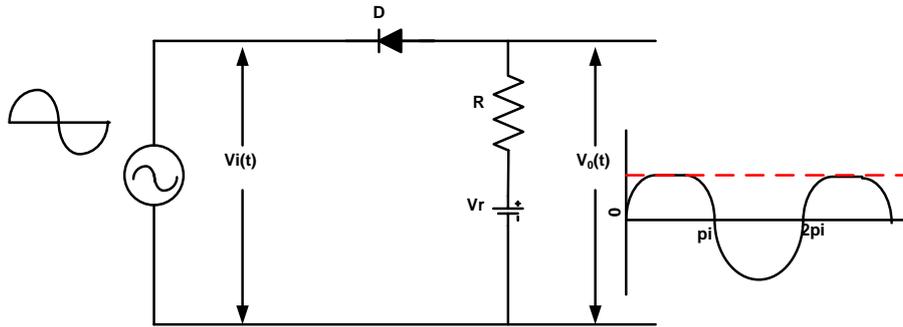$$V_0(t) = V_R \quad for \quad V_i(t) > V_R$$

Circuit Diagram:

Fig.1 Series Diode Positive limiting circuit

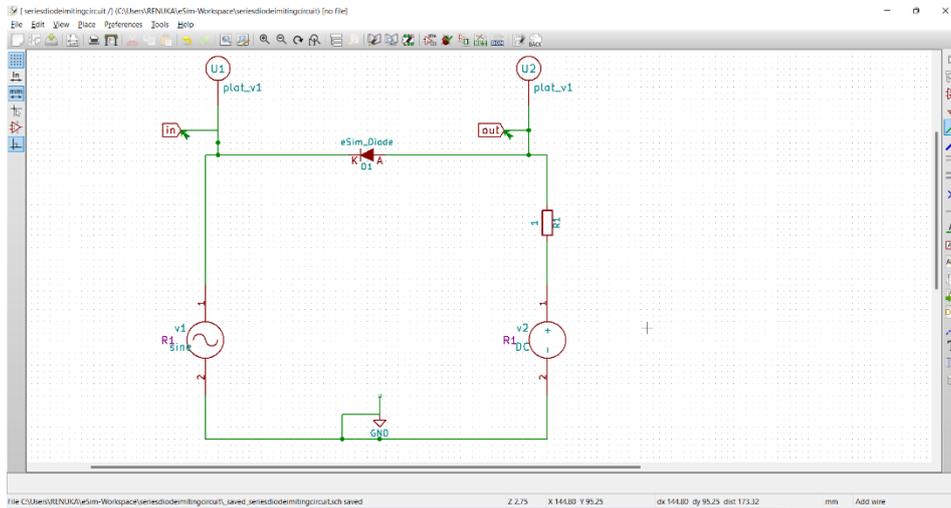**Results/ Output (ngspice and Python plots)**

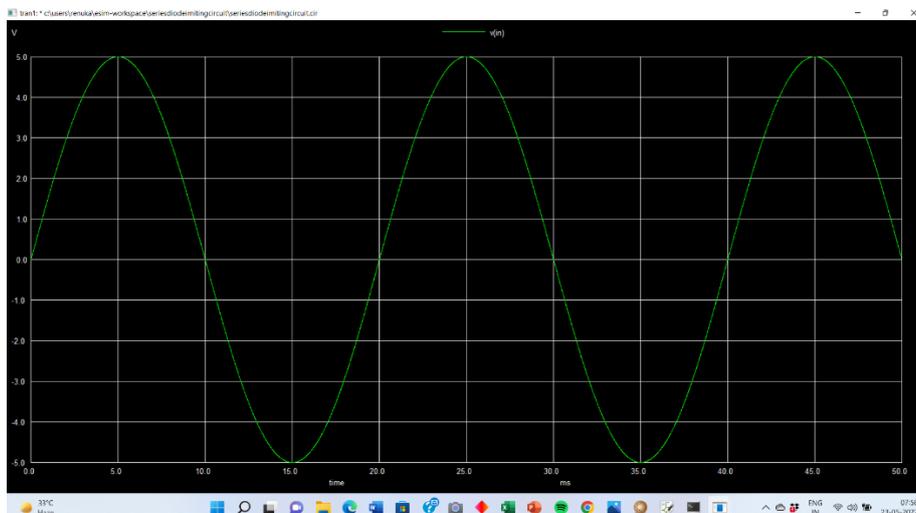Fig. 2 esim Series Diode Positive limiting circuit

Fig. 3 Ngspice plot of input voltage to the circuit

Fig. 4 Ngspice plot of output clipped voltage across the circuit
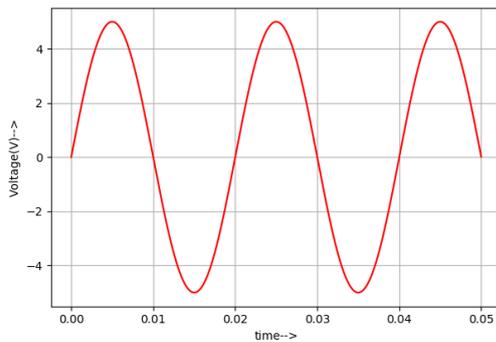

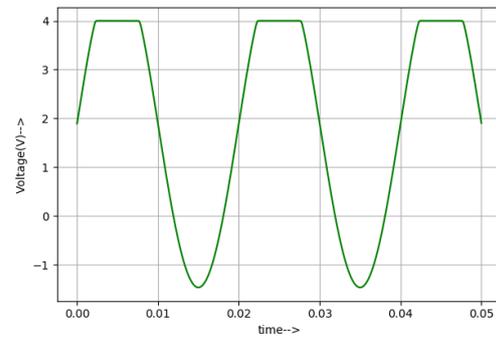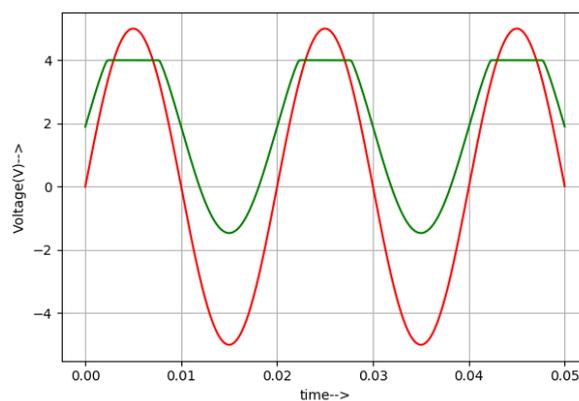Fig. 5 Input voltage Series Diode Positive limiting circuit

Fig. 6 output voltage Series Diode Positive limiting circuit

Python plot of Input and Output Voltage

Conclusion: Parallel Diode Positive limiting circuit is simulated successfully using esim software.

Source/Reference(s): Mothiki S. Prakash Rao, Pulse and Digital Circuit, Tata McGraw-Hill Publishing company limited. Chapter No. 2 Nonlinear Waveshaping Pg. No. 91.