



جامعة ساوة الاهلية

كلية التقنيات الهندسية

القسم: الفيزياء الطبية والعلاج الاشعاعي

المرحلة الثانية / الفصل الثاني

عنوان المحاضرة:

Diode Amplications

رقم المحاضرة (5)

**the Fifth lecture
ninth week**

اسم المحاضر: عطا الله باني حمود

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
IN THE NAME OF GOD, THE MOST
GRACIOUS, THE MOST MERCIFUL

**Department of Physics
and Radiotherapy**

Diode Applications

(I) Clipper Circuits

The Clipper Diode, also known as a Diode Limiter, is a wave shaping circuit that takes an input waveform and clips or cuts off its top half, bottom half or both halves together.

diode clipping circuits can be used in voltage limiting applications. diode clipping circuits can be used in voltage limiting applications.

(a) Positive Clipper :

It clips or cuts off its top half as shown in fig. (19) below

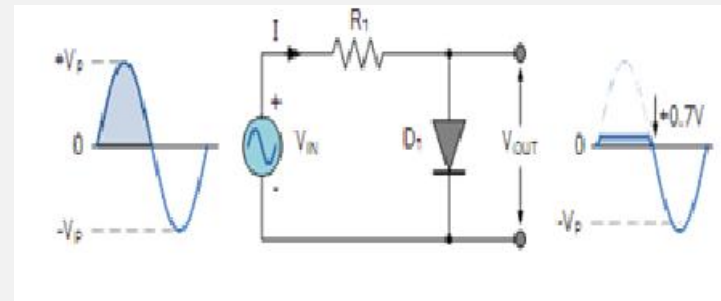


Figure (19) Positive Clipper

(b) Negative Clipper :

It clips or cuts off its bottom half as shown in fig. (20) below

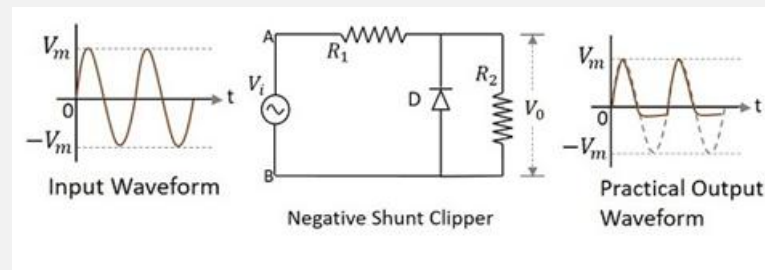


Figure (20) Negative Clipper

(c) Two-way Clipper

This is a positive and negative clipper with a reference voltage V_r . The input voltage is clipped two-way both positive and negative portions of the input waveform with two reference voltages. For this, two diodes D_1 and D_2 along with two reference voltages V_{r1} and V_{r2} are connected in the circuit.

This circuit is also called as a **Combinational Clipper** circuit. The figure below shows the circuit arrangement for a two-way or a combinational clipper circuit along with its output wav

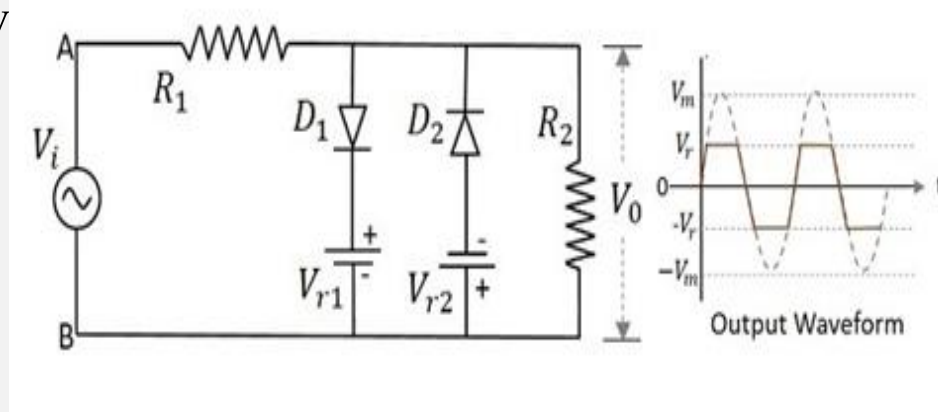


Figure (21) Combinational Clipper

(II) Clamper circuits

A Clamper Circuit is a circuit that adds a DC level to an AC signal. Actually, the positive and negative peaks of the signals can be placed at desired levels using the clamping circuits. As the DC level gets shifted, a clamper circuit is called as a **Level Shifter**.

- **Positive Camper:**

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.

$$V_{0\text{out}} = V_{\text{in}} + V_m = 2V_m \quad \text{-----}(14)$$

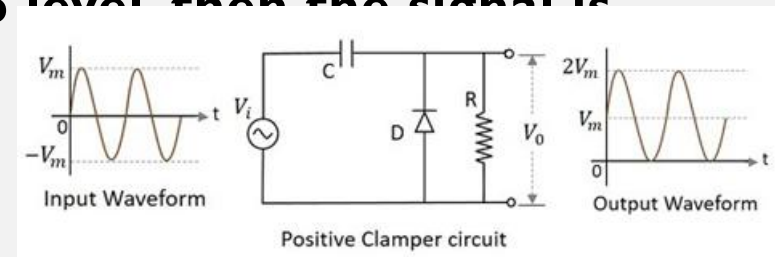


Figure (22) Positive Camper

- **Negative Camper:**

A Negative Clamper circuit is one that consists of a diode, a resistor and a capacitor and that shifts the output signal to the negative portion of the input signal. The figure (23) below explains the construction of a negative clamper circuit.

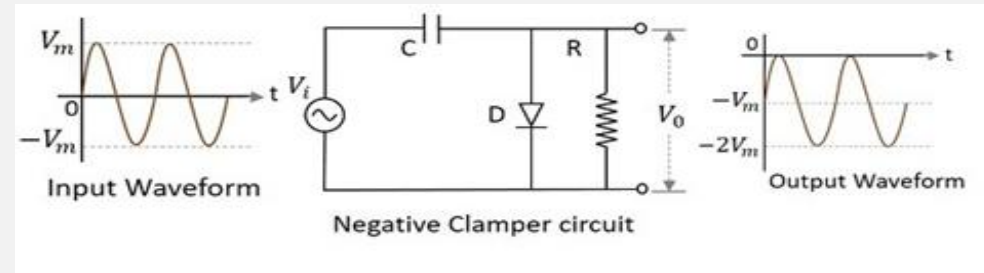


Figure (23) Negative Clamper

$$V_{0ut} = V_{in} + V_m = -2V_m \text{ -----(15)}$$

(III) Voltage Doublers

A voltage doubler is an electronic circuit that generates an output voltage twice as high as its input voltage.

Voltage doublers are essential in devices requiring high voltages, such as ion pumps and X-ray systems, due to their efficiency in stepping up voltage.

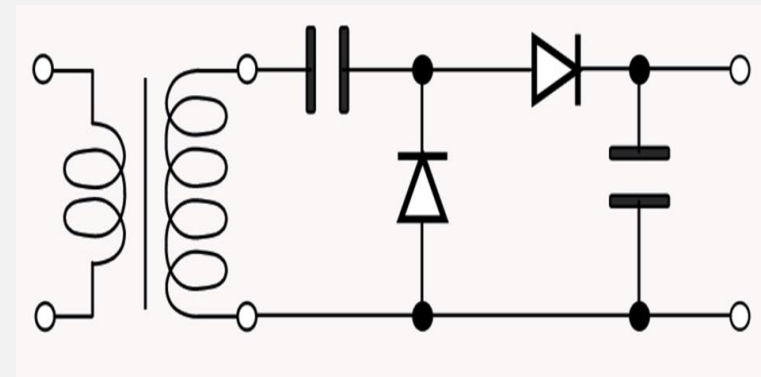
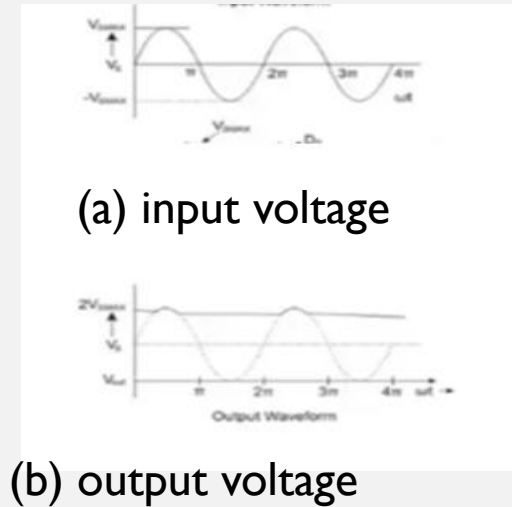


Figure (23) Voltage Doupler

انتہی شکرا لاستماعکم