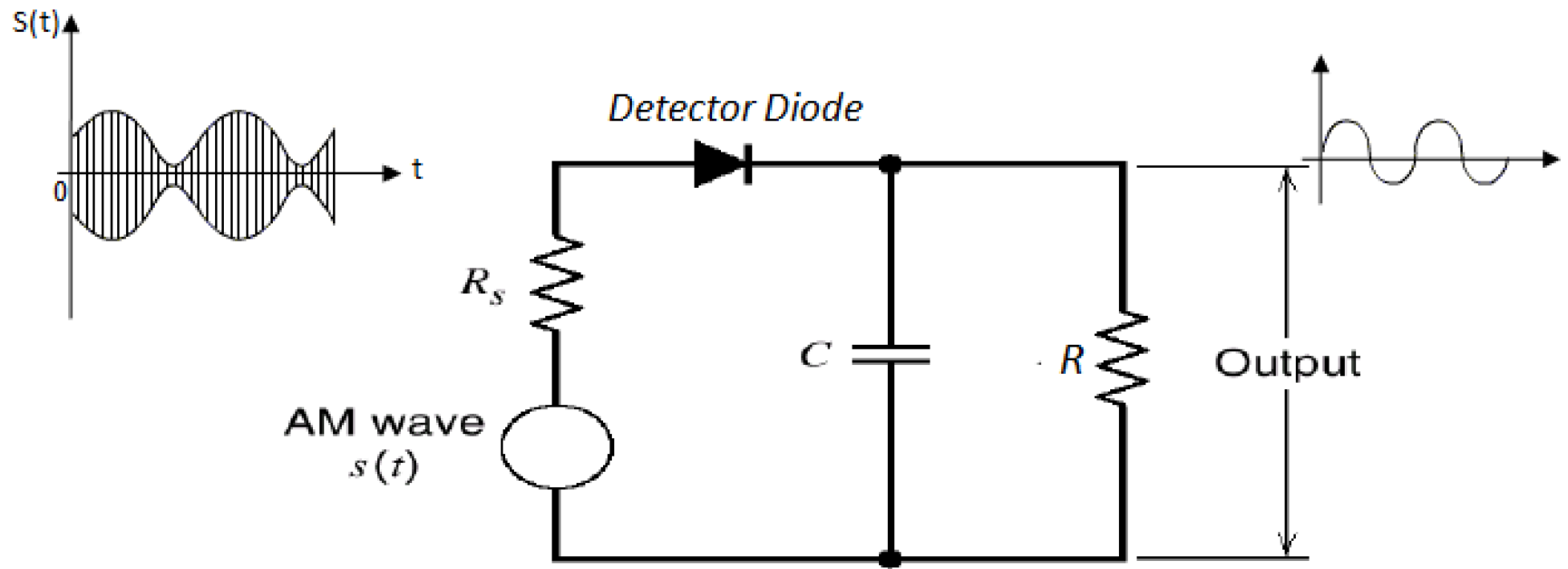


Envelope Detector



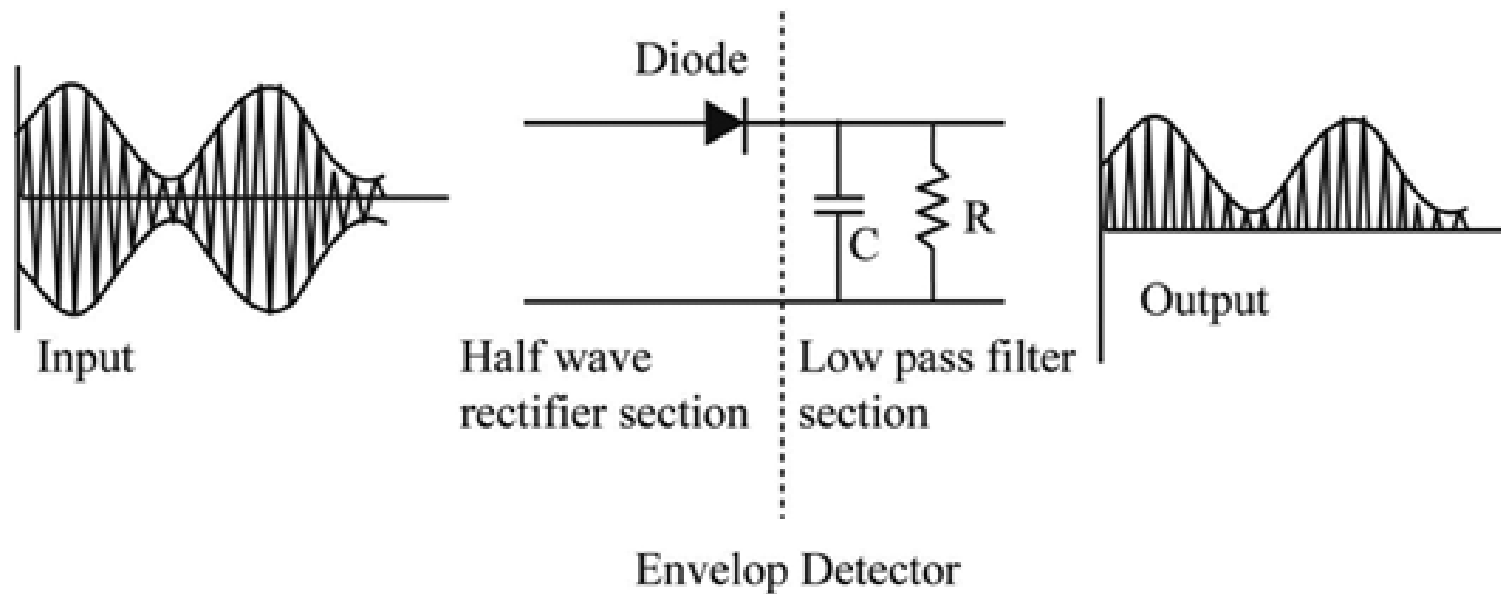
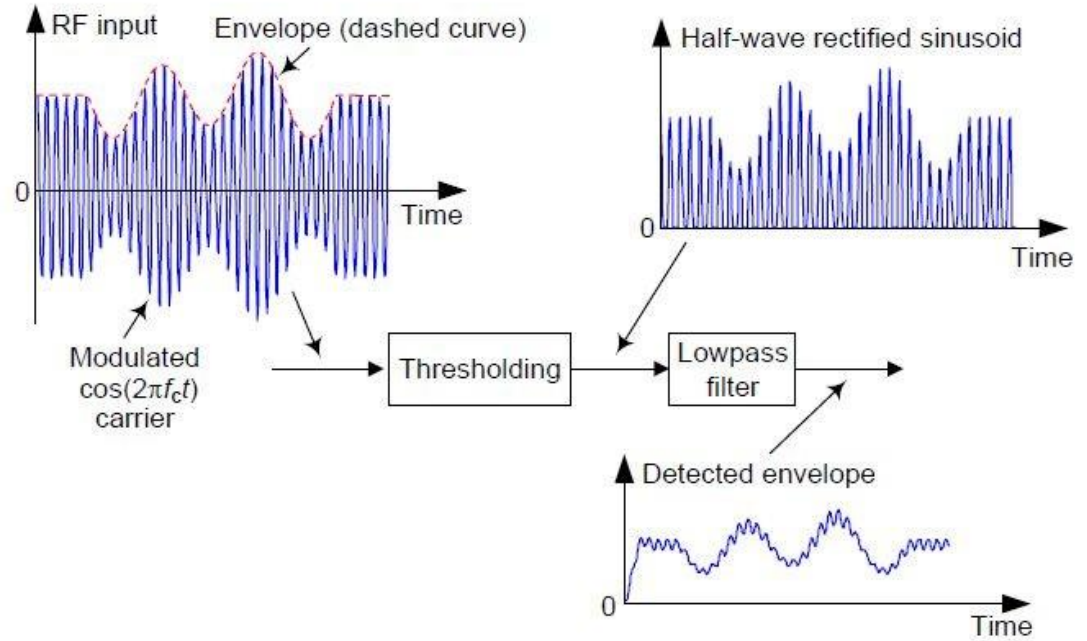
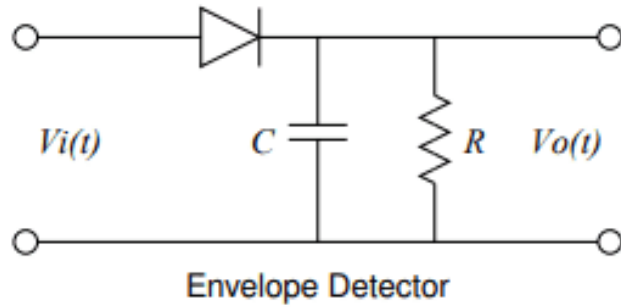


Figure 1

Envelope Detector



Selection of the RC time Constants

The capacitor charges through D and R_s when the diode is on and it discharges through R when the diode is off.

The charging time constant $R_s C$ should be short compared to the carrier period $1/f_c$.

Thus, $R_s C \ll 1/f_c$

Selection of the RC time Constants

On the other hand, the discharging time constant RC should be long enough so that the capacitor discharges slowly through the load resistance R . But, this time constant should not be too long which will not allow the capacitor voltage to discharge at the maximum rate of change of the envelope.

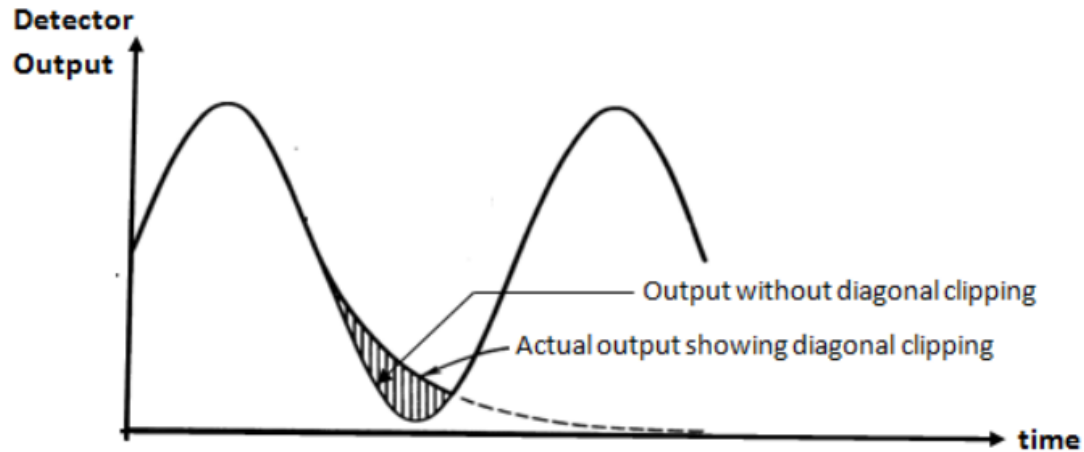
Therefore,

$$1/f_c \ll RC \ll 1/f_m$$

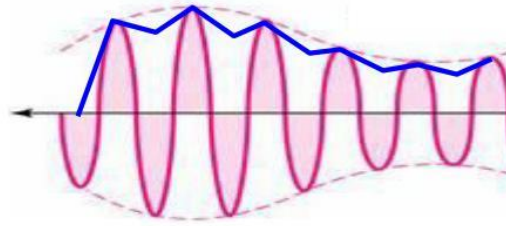
Distortions in the Envelope Demodulator Output

Diagonal Clipping

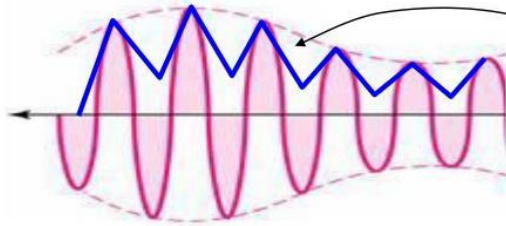
This type of distortion occurs when the RC time constant of the load circuit is too long. Due to this, the RC circuit cannot follow the fast changes in the modulating envelope. The diagonal clipping is shown in fig. 5.



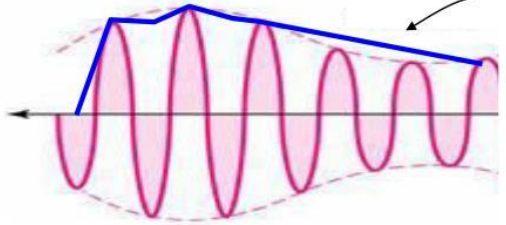
Selection of the RC time Constants



Optimum AM Demodulation



Ripple amplitude in AM
Demodulation – RC too small



Diagonal Clipping/distortion in
AM Demodulation – RC too large