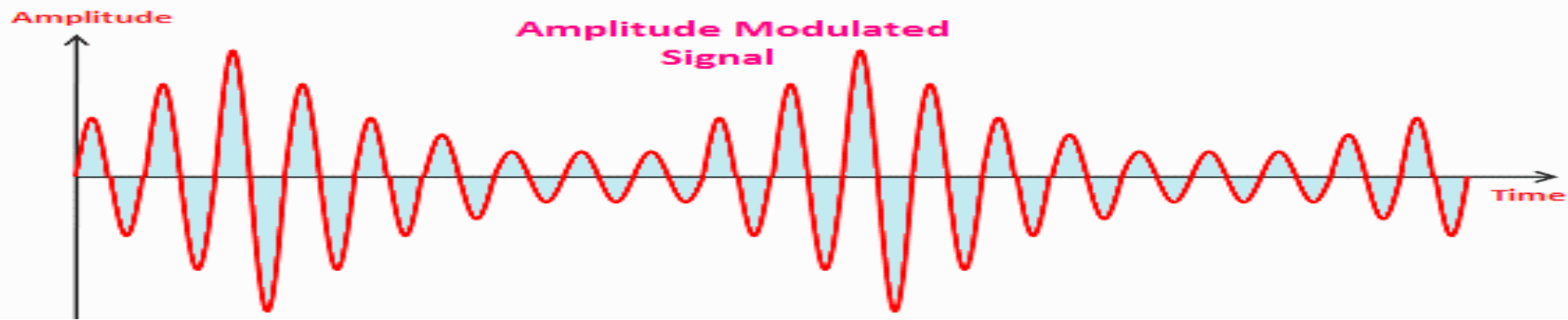
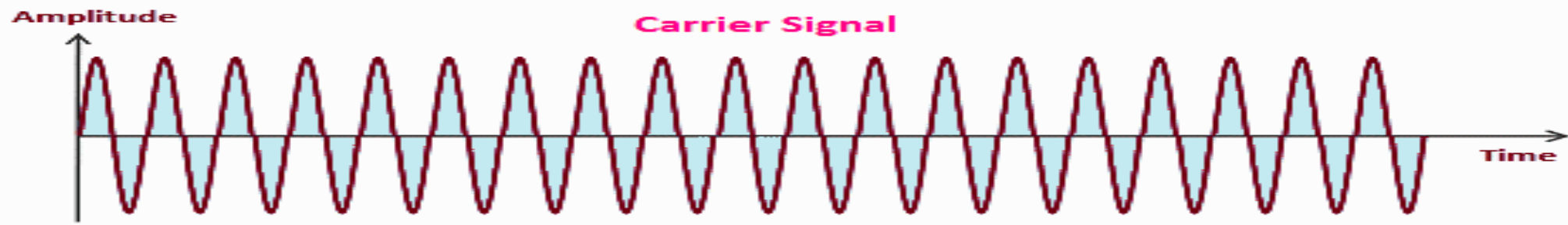
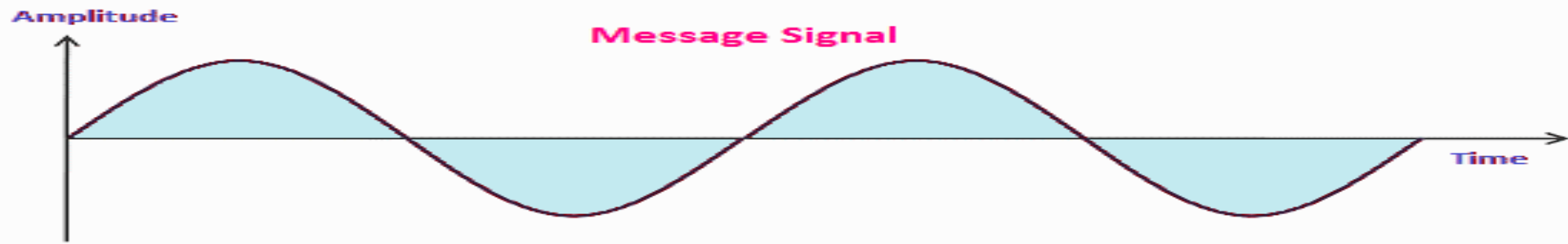


Chapter:-2
(Features of Modulation)
Presented by
Hasan Murad Munna

Amplitude Modulation:

- Amplitude modulation (AM) is a modulation technique used in electronic communication, most commonly for transmitting messages with a radio wave. In amplitude modulation, the amplitude (signal strength) of the carrier wave is varied in proportion to that of the message signal, such as an audio signal.

Amplitude Modulation



Modulation Index or Depth of Modulation:

The amplitude modulation AM modulation depth figure is complementary to the modulation index. Typically the modulation depth is the amplitude modulation index expressed as a percentage. In this way an AM modulation index of 0.75 would be expressed as a modulation depth of 75%.

$$E_m = \frac{E_{\max} - E_{\min}}{2} \quad \dots (1.2.5)$$

and

$$E_c = E_{\max} - E_{\min} \quad \dots (1.2.6)$$

$$= E_{\max} - \frac{E_{\max} - E_{\min}}{2} \text{ by putting for } E_m \text{ from equation (1.2.5)}$$

$$= \frac{E_{\max} + E_{\min}}{2} \quad \dots (1.2.7)$$

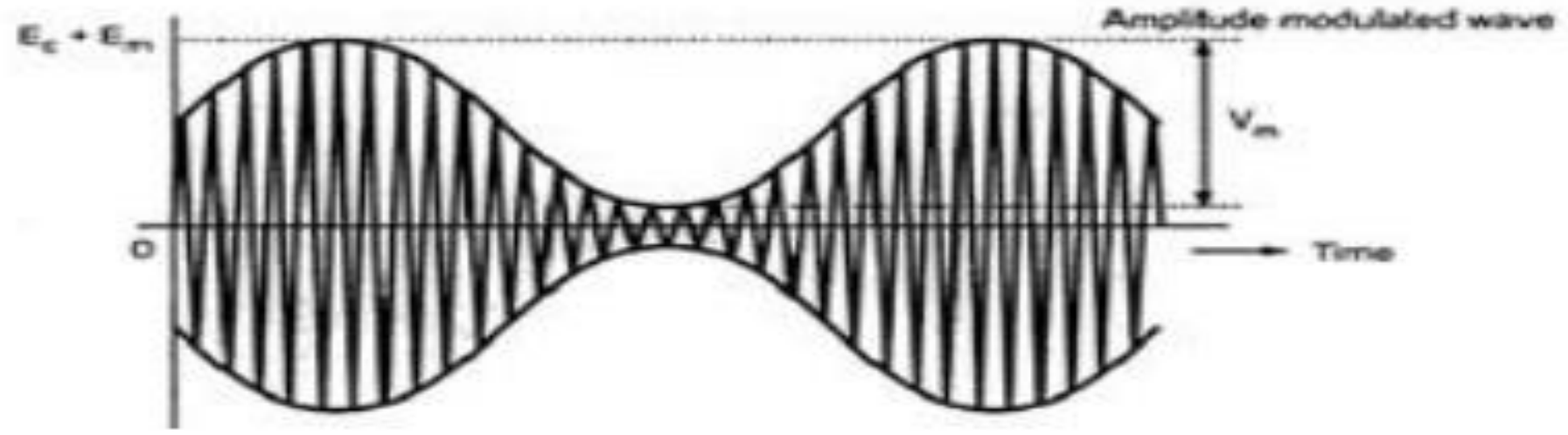
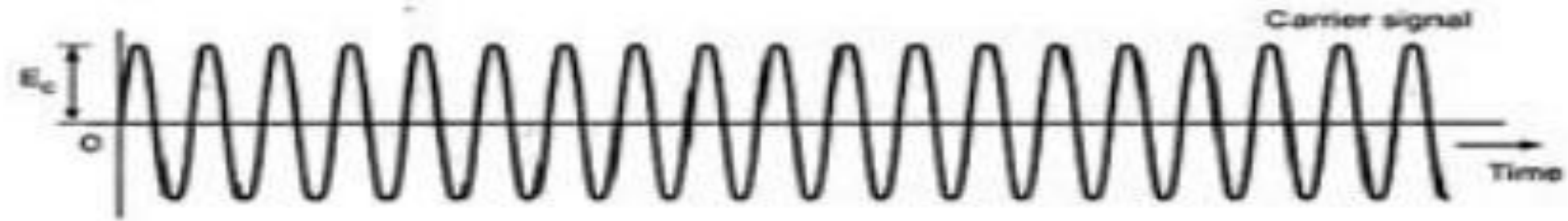
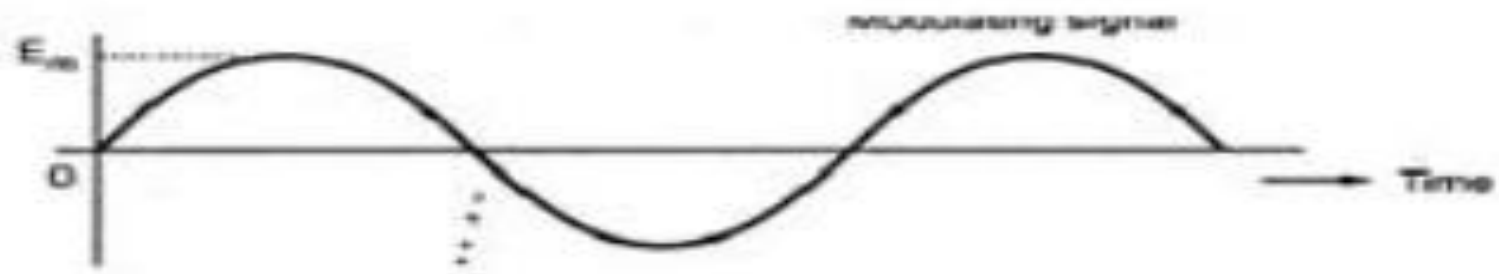
Taking the ratio of equation (1.2.5) and above equation,

$$m = \frac{E_m}{E_c} = \frac{\frac{E_{\max} - E_{\min}}{2}}{\frac{E_{\max} + E_{\min}}{2}}$$

\therefore

$$\boxed{m = \frac{E_{\max} - E_{\min}}{E_{\max} + E_{\min}}} \quad \dots (1.2.8)$$

This equation gives the technique of calculating modulation index from AM wave.



Difference Between AM & FM:

S.No	Parameters	FM	AM	PM
1.	Definition	Frequency modulation is a technique of modulation, in which frequency of carrier varies in accordance with the amplitude of modulating signal. Keeping amplitude and phase constant.	The amplitude modulation is a technique of modulation in which the amplitude of the carrier wave varies in accordance with the amplitude of the modulating signal. Keeping frequency and phase constant.	The phase modulation is a technique of modulation in which phase of the carrier wave varies in accordance with the amplitude of the modulating signal. Keeping amplitude and frequency constant.
2.	Noise	Noise immunity of FM is superior to AM and PM	AM receivers are very susceptible to noise	Noise immunity better than AM but not FM
3.	Function	The frequency of the carrier wave deviates as per the voltage of the modulating signal input.	The amplitude of a carrier wave in AM diverges as per amplitude or voltage of modulating signal input	A phase of the carrier wave varies as per the voltage of modulating signal input.
4.	Constant parameter	The amplitude of the carrier wave is kept changeless.	The frequency of the carrier wave is kept invariable.	The amplitude of the carrier wave is kept changeless.
5.	Types	Digital FM types: FSK, GFSK, offset PSK	AM types: DSB-SC, SSB, VSB, etc.	Digital PM types: QPSK, BPSK, QAM (the combination of amplitude and phase, modulation).
6.	Waveforms			