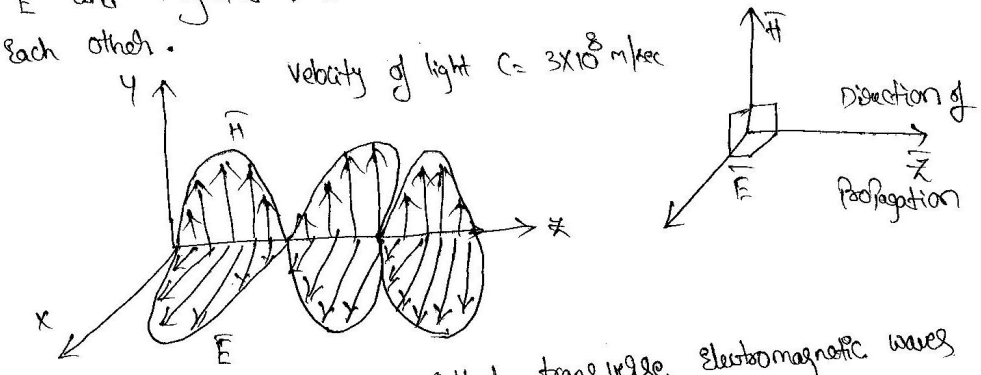
The Power radiated by the current carrying conductor then propagates in the free space in form of em waves. These EM waves are oscillating in nature. In free space EM waves travel with speed of light.

The transmitted wave consists of 2-types of fields namely electric field $\bar{E}$ and magnetic field $\bar{H}$. These two fields are mutually perpendicular to each other.



The Electromagnetic waves are called transverse electromagnetic waves (TEM waves)

The speed of em waves in any medium other than free space is

$$V = \frac{C}{\sqrt{\varepsilon_r}}$$

C = Velocity of light

ε_r = Relative Permitivity of medium.

*) Polarization of Em Waves :-

The orientation of electric field vector with respect to earth's surface is called Polarization of plane EM wave.

3-types of Polarization.

1. Linear Polarization
   - Horizontal Polarization
   - Vertical "
2. Circular Polarization
3. Elliptical Polarization

1) Linear Polarization :- If Polarization vector remains Constant throughout the Polarization then it Called linear Polarization

(a) Horizontal " :- If the Electric field Propagates in direction Parallel to the Earths Surface then it is horizontal Polarization.

(b) vertical Polarization :- If Electric field Propagates in a direction of Perpendicular to the Earths Surface then it Called vertical Polarization

2) Circular Polarization :- If Polarization vector rotates 360° as the Em wave travels distance Equal to one wavelength through free space with Equal field strength at all angles of Polarization.

3) Elliptical Polarization :- If the field strength of circularly Polarized wave varies with changes in Polarization then it is Called Elliptical Polarization ".

*) Rays and Wavefront :-

A ray is a line drawn along the direction of Propagation of EM wave. Basically a ray indicates relative direction of the wave Propagation.

A wavefront is nothing but a surface of Constant Phase of a wave. Such a wavefront Can be obtained by joining together all the points of Equal Phase on the rays Propagated from the same source.

Unit - 7

Wave Propagation - 1

Introduction :-

In 1864 Maxwell discovered time varying Electric and magnetic fields together gives rise to an EM waves travelling in space with the velocity of light.

Later Prof. Hertz explained that the Em Radio waves follows the law of rectilinear Propagation, that means the waves travel from transmitter to received in straight line.

When the signal Propagates through the space, the amplitude of the signal decreases rapidly as the distance at a point from the transmitting antenna increases.

The path of that Em wave follows depends on the freq of the signal, atmospheric Conditions and also on time of the day. The 3-basic path that Radio signal. Can take are

(a) ground wave Propagation (Surface wave)
(b) Sky wave " (Ionospheric wave)
(c) Space " " .

* Wave Propagation :-

When ever high frequency current flows through a Conductor the Power is generated. A part of Power supplied is dissipated in the resistance of Conductor and the part of the Power escapes in to free space. The Power escaped in free space is nothing but radiation.