EC-8 **Circular Polarisation :-** when the field components E_x and E_y are out of phase by 90° with each other. The variation of these field components makes the resultant vector rotate in a circular path. Such a polarisation is called circular polarisation.

As we know that,

$$\vec{E} = E_x\vec{E}_x + E_y\vec{E}_y$$

Since the fields vary sinusoidally, each component of electric field is denoted with an instantaneous value with magnitude E_m

$$\therefore E_x = E_m \sin\omega t \quad \text{——— (1)}$$

and $E_y = E_y \sin(90° - \omega t)$

$$\therefore \vec{E} = E_m \sin\omega t\,\hat{i} + E_m \sin(90° - \omega t)\hat{j}$$

$$= E_m \sin\omega t\,\hat{i} + E_m \cos\omega t\,\hat{j}$$

$$\therefore |\vec{E}| = \sqrt{(E_m \sin\omega t)^2 + (E_m \cos\omega t)^2}$$

$$= \sqrt{E_x^2 + E_y^2} = E_m$$

$$\therefore E_m^2 = E_x^2 + E_y^2 \quad \text{——— (2)}$$

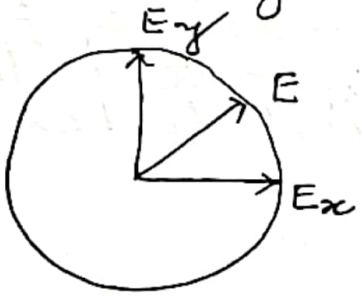

Fig. (2). Circularly Polarised

The above equation (2) is locus of a circle. This is called circularly polarised.