

Date
8/2/2025

Resultant of two SHMs at Right Angle
in .

Some important cases \rightarrow

(1) First is \rightarrow When $\phi = 0^\circ$ then

$$\sin \phi = 0 \text{ and}$$

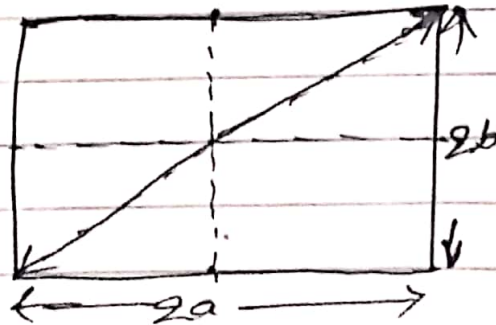
$$\cos \phi = 1$$

Substituting in eqn

$$\frac{y^2}{b^2} - \frac{2xy}{ab} \cos \phi + \frac{x^2}{a^2} = \sin^2 \phi$$

$$\frac{y^2}{b^2} - \frac{2xy}{ab} \cos \phi + \frac{x^2}{a^2} = 0$$

$$\therefore \frac{y^2}{b^2} - \frac{2xy}{ab} + \frac{x^2}{a^2} = 0$$



$$\therefore \left(\frac{y}{b} - \frac{x}{a} \right)^2 = 0 \quad (A)$$

This, the resultant motion is a pair of coincident straight lines in quadrants I and III of rectangle as fig (A). The straight lines are inclined to the x-axis at an angle θ given by

$$\theta = \tan^{-1} \left(\frac{b}{a} \right)$$

\therefore