☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☐ Sat ☐ Sun

> Date

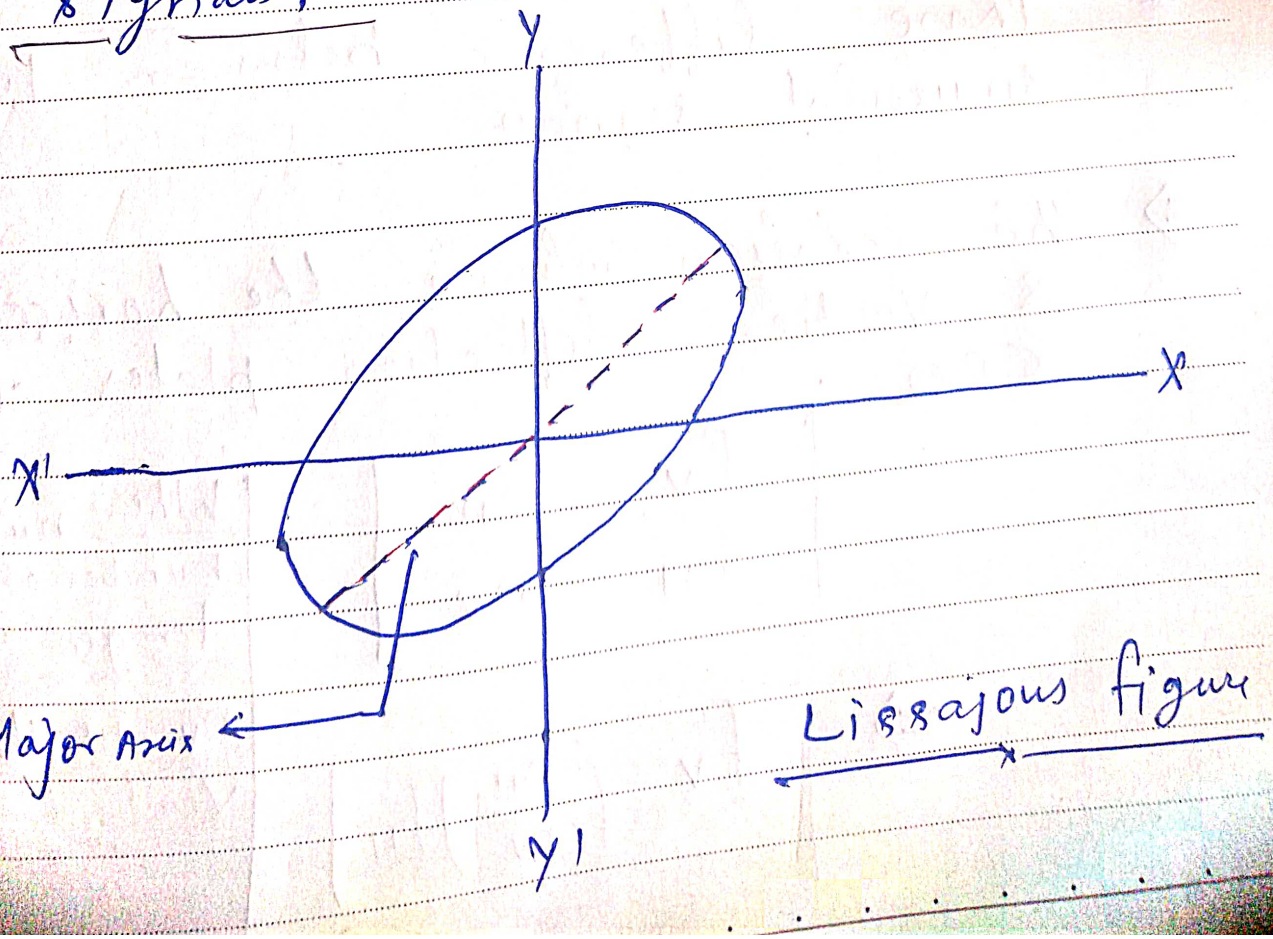
Dr. Giridhar Kumar.

8 FEB 2024. SEM-II MJC PHYSICS, Unit-II

Topic :- Lissajous figure.

This is the pattern which is displayed on the screen, when sinusodial signals are applied to both horizontal & Vertical deflection plates of CRO.

These patterns will vary ~~based~~ based on the amplitudes, frequencies and phase differences of the sinusoidal signals, which are applied signals.



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In given figure, this is in elliptical shape and its major axis has some inclination angle with positive x-axis.

* Measurement using Lissajous figure

We can do the following two measurement from a Lissajous figure

* Frequency of the sinusoidal signal
* Phase difference between two sinusoidal signals.

⇒ The relation between the horizontal & vertical deflection plates of CRO

$$\frac{f_V}{f_H} = \frac{n_H}{n_V}$$

Where n_H is the number of horizontal tangencies.

n_V is the no of vertical tangencies

$$\Rightarrow f_V = \left(\frac{n_H}{n_V}\right) f_H$$

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* If the major axis of an elliptical shape Lissajous figure having an inclination angle lies between 0° and 90° with positive X-axis, then the phase difference between the two sinusoidal signals will be.

$$\Rightarrow \boxed{\phi = \sin^{-1}\left(\frac{x_1}{x_2}\right) = \sin^{-1}\left(\frac{y_1}{y_2}\right)}$$

* If the major axis of an elliptical shape Lissajous figure having an inclination angle lies between. 90° and 180° with positive X-axis then the phase difference between the two sinusoidal signal will be.

$$\Rightarrow \boxed{\phi = 180° - \sin^{-1}\left(\frac{x_1}{x_2}\right) = 180° - \sin^{-1}\left(\frac{y_1}{y_2}\right)}$$