

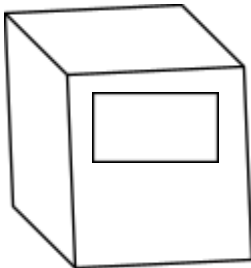
EXPERIMENT NO: 4

Aim: To study Lissajous pattern on Cathode ray oscilloscope (CRO).
and calculate unknown frequency of AC signals.

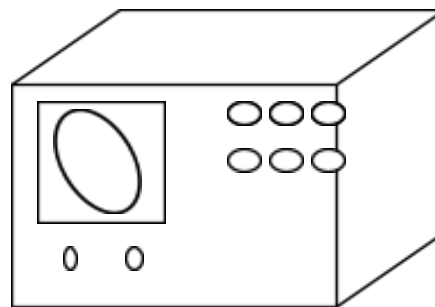
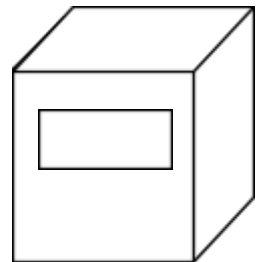
Apparatus: CRO, two frequency generators, connecting wires etc.

Diagram:

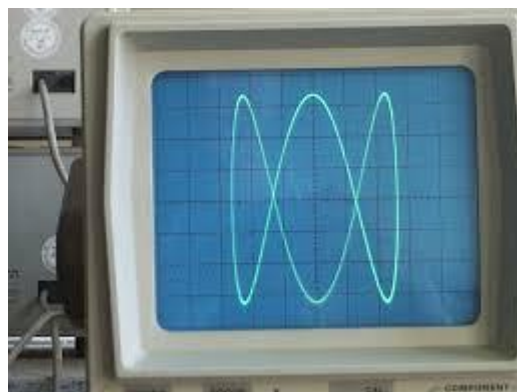
Frequency generator-x



Frequency generatorY



CRO



Formula:

Unknown frequency: $F_Y = F_X \left[\frac{L_x}{L_y} \right]$

Where,

F_Y = Frequency of frequency generator-Y

F_x = Frequency of frequency generator-X

L_x = No. of loops along X- direction

L_y = No. of loops along Y- direction

Observation Table:

Sr. No.	Pattern of Lissajous figure	No. of loops along X-direction [L_x]	No. of loops along Y-direction [L_y]	Known frequency (Applied frequency) [F_x]	Unknown frequency (calculated frequency) [F_y]	Ratio of frequency [$F_x : F_y$]
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Calculation:

Calculate unknown frequencies:

1. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- Hz

2. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- Hz

3. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- Hz

4. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- Hz

5. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- Hz

6. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- Hz

7. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- - Hz

8. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- Hz

9. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- Hz

10. $F_y = F_x \left[\frac{Lx}{Ly} \right] =$ = ----- Hz

Procedure:

1. Connect frequency generator-2 to Y-input of CRO, whose signal frequency is to be measure.
2. Connect frequency generator-1 to X -input of CRO, whose signal frequency is to be applied.
3. Now the known frequency is adjusted so Lissajous pattern can be obtained on the screen which depends on the ratio of two frequencies.
4. Now count no. of loops along x-direction and along y- direction.
5. Calculate frequency of frequency generator-2 i.e unknown frequency by using above given formula.
6. Continue change the frequency of frequency generator-1 and from above method find the unknown frequency.
7. For different values of frequency of frequency generator-1 calculate frequency of frequency generator-2.

Result:

In study of Lissajous figure on CRO, we found out above unknown frequencies of different signals using Lissajous pattern.

Precaution:

1. CRO must be calibrated.
2. All nobes of CRO must be in proper condition of ON or OFF as required.
3. During taking reading sinusoidal wave pattern must be stationary.
4. Applied voltage must be in small range.