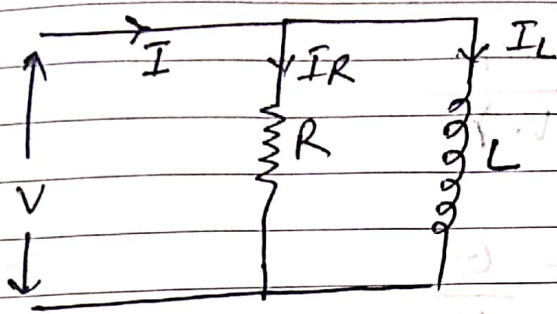


Parallel R-L Circuit

Day (216-149) • Week 32



$$I_R = \frac{V}{R} \text{ (amp)}$$

$$I_L = \frac{V}{jX_L} \text{ (amp)}$$

$$X_L = \omega L = 2\pi fL$$

in a parallel ckt voltage value is equal in each element
 in a series ckt current value is equal in each element.

Note inductance current applied voltage in a parallel R-L ckt
 > if j terms are used in denominator it means it will be in lag condition by 90°
 > if j terms are used in numerator it means it will be in lead condition from reference quantity by 90°

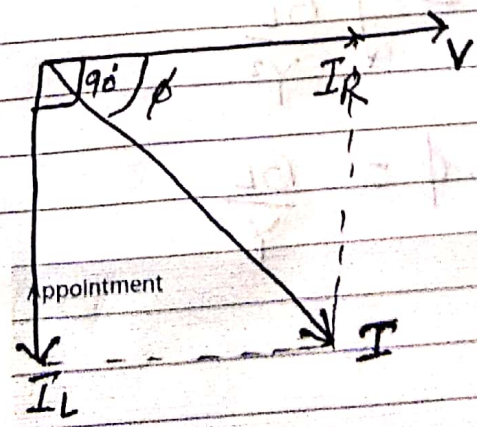
1. phasor diagram :->

2. Admittance

$$I = I_R + I_L$$

$$I = \frac{V}{R} + \frac{V}{jX_L}$$

where
 $Y = \text{admittance} = \frac{I}{V}$
 $G = \text{conductance} = \frac{1}{R}$
 $B_L = \text{susbtance} = \frac{1}{X_L}$



$$\frac{I}{V} = \frac{1}{R} + \frac{1}{jX_L}$$

$$Y = G + B_L$$

									September '11
Monday	1	2	3	4	5	6	7	8	9
Tuesday	10	11	12	13	14	15	16	17	18
Wednesday	19	20	21	22	23	24	25	26	27
Thursday	28	29	30	1	2	3	4	5	6
Friday	7	8	9	10	11	12	13	14	15
Saturday	16	17	18	19	20	21	22	23	24
Sunday	25	26	27	28	29	30	31		

Notes

unit of Admittance (Ω^{-1}) or mho

$$\therefore \cos \phi = \frac{IR}{I} = \frac{V/R}{V \cdot Y}$$

$$= \frac{V \cdot G}{V \cdot Y} = \frac{G}{Y}$$

$$\sin \phi = \sqrt{1 - \cos^2 \phi}$$

$$= \sqrt{1 - \frac{G^2}{Y^2}}$$

$$= \sqrt{\frac{Y^2 - G^2}{Y^2}}$$

$$= \sqrt{\frac{G^2 + B_L^2 - G^2}{Y^2}}$$

$$= \sqrt{\frac{B_L^2}{Y^2}}$$

$$\sin \phi = \frac{B_L}{Y}$$

August '11

Monday	1	8	15	22	29
Tuesday	2	9	16	23	30
Wednesday	3	10	17	24	31
Thursday	4	11	18	25	
Friday	5	12	19	26	
Saturday	6	13	20	27	
Sunday	7	14	21	28	

Notes

Appointment

Current :->

$$I = V \cdot Y$$

$$= V \cdot \sqrt{G^2 + B_L^2} \quad \text{amp}$$

Active Power :->

$$P = V \cdot I \cos \phi$$

$$= V \cdot V \cdot Y \cdot \frac{G}{Y}$$

$$P = V^2 \cdot G \quad \text{watt}$$

Reactive Power :-

$$Q = V I \sin \phi \quad (\text{VAR})$$

$$= V \cdot V \cdot Y \cdot \frac{B_L}{Y}$$

$$Q = V^2 B_L$$

Apparent Power

$$S = V I \quad (\text{VA})$$

$$= V \cdot V \cdot Y$$

$$S = V^2 Y$$

Notes

Appointment

Sunday

Septem

Monday	5	12	1
Tuesday	6	13	2
Wednesday	7	14	3
Thursday	1	8	15
Friday	2	9	16
Saturday	3	10	17
Sunday	4	11	18