(11) Pure inductor / Pure capacitor

$\phi = +\pi/2$ $\phi = -\pi/2$

$P_{avg} = 0$ → Pure L and Pure C
↳ over a full cycle

Pure L: $P_{inst} = \frac{e_0 I_0}{2} \sin 2\omega t$

$P_{inst} \longrightarrow f = 2\omega$ and pure C

- In case of Resonance

$P_{avg} = e_{RMS} I_{RMS}$

(12) LC oscillation

Max current $I_{max} = Q_0 \omega$

$I_{max} = \frac{Q_0}{\sqrt{LC}}$ $q = Q_0 \cos \omega t$

$q = Q_0 \sin(\omega t + \pi/2)$

$I = \sqrt{\frac{C(V_1^2 - V_2^2)}{L}}$

(13) CHOKE COIL

↳ control → current in AC

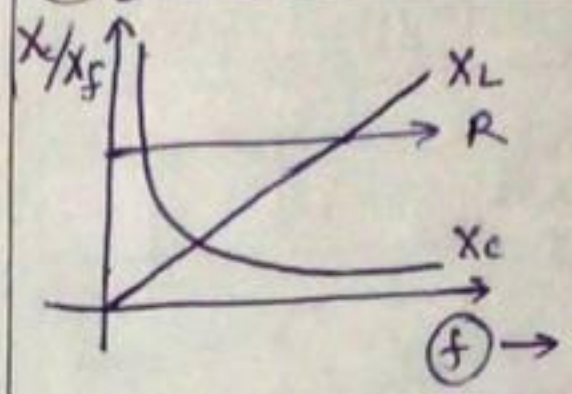
→ why not capacitor → costly
→ i → control, R_0 → Heat loss, Power loss

$Z = \sqrt{R^2 + X_L^2}$

$Z \uparrow$ $i \downarrow$ $V = IZ \uparrow$

- In LCR → power is dissipated only in resistor.

(14) Circuit behaviour at diff frequ



① $f = f_R$ $X_L = X_C$ → Pure resistance

② $f > f_R$ $X_L > X_C$ → voltage aage i peeche

③ $f < f_R$ $X_C > X_L$ → voltage ~~aage~~ peeche i aage

Wattless current $= I_{RMS} \sin\phi$
Wattfull current $= I_{RMS} \cos\phi$

	Sinusoidal A/c	Square A/c	Tri-angular	full wave Rectifier	Half wave Rectifier
Avg. full cycle	0	0	0	$\frac{2i_0}{\pi}$	$\frac{i_0}{\pi}$
Avg Half cycle	$\frac{2i_0}{\pi}$	i_0	$\frac{i_0}{2}$	$\frac{2i_0}{\pi}$	$\frac{2i_0}{\pi}$, 0
RMS value	$\frac{i_0}{\sqrt{2}}$	i_0	$\frac{i_0}{\sqrt{3}}$	$\frac{i_0}{\sqrt{2}}$	$\frac{i_0}{2}$

- Power drop across pure capacitor.

$\cos\phi = 0$ $\langle P \rangle = 0$

wattless current

- $i = a + b\sin(\omega t)$

$i_{rms} = \sqrt{a^2 + \frac{b^2}{2}}$

- $i = a\sin\omega t + b\cos\omega t$

$i_{rms} = \sqrt{\frac{a^2}{2} + \frac{b^2}{2}}$

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