Please find I_o in the circuit below. All values are in **rms**

* Capacitor

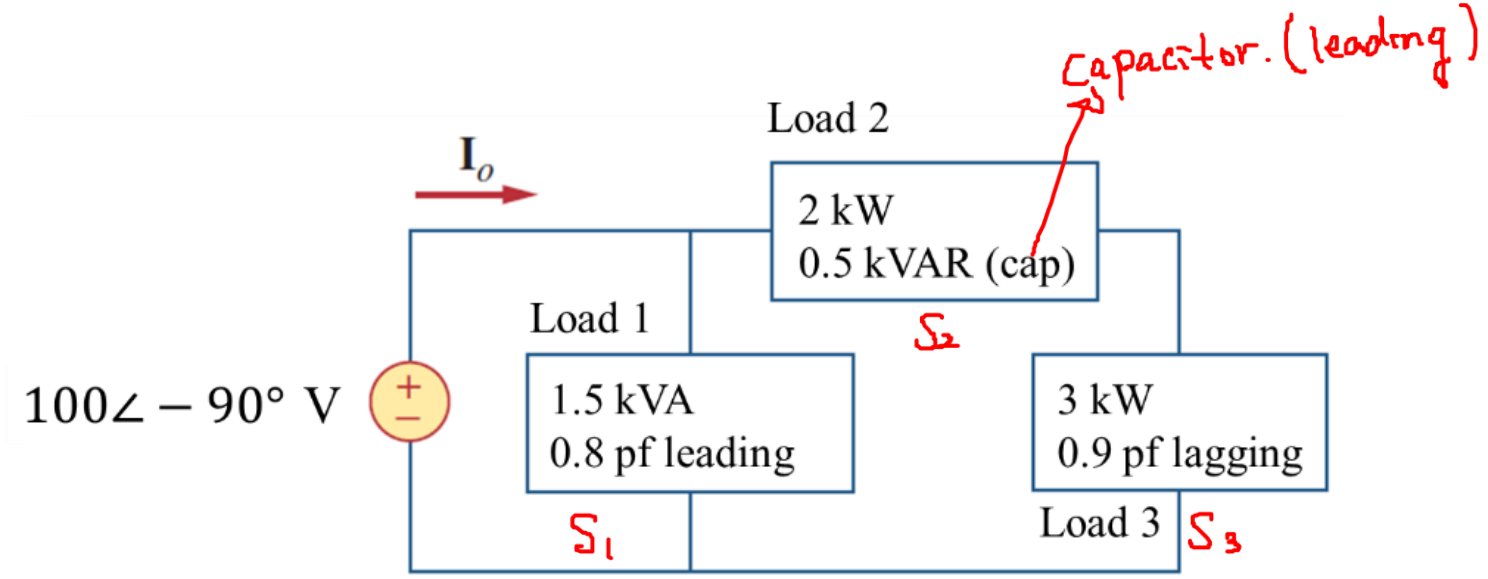
C → $\frac{1}{j\omega C} = -j\frac{1}{\omega C}$.

$V = I \times (-j\frac{1}{\omega C})$

$\theta_v = \theta_i - 90°$

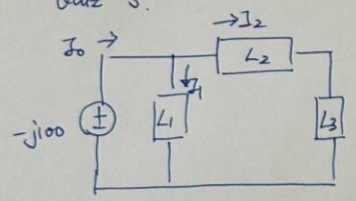
leading.

$\theta_v - \theta_i < 0$

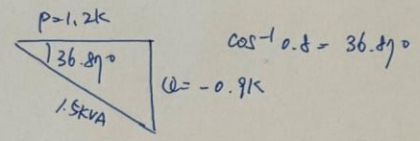


→ Conservation of Complex power

Quiz 3.



$L_1 = 1.5\text{kVA}$
0.8 pf leading

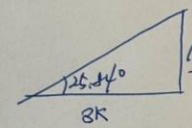


$\cos^{-1} 0.8 = 36.87°$

$S_1 = 1.2k - j0.9k.$

$L_2 = 2\text{kW}$
0.5KVAR (cap) $\rightarrow$ $S_2 = 2k - j0.5k.$

$L_3 = 3\text{kW}$
0.9pf lagging



$\cos^{-1} 0.9 = 25.84°$

$Q = \tan 25.84° \times 3k = 1452.8$

$S_3 = 3k + j0.45k.$

① $S_2 + S_3 = 5k + j0.95k = V \times I_2^*$

$$V \times I_2^* = \frac{5k + j0.95k}{-j100.} = 50.89 \angle 100.75°$$

$$I_2 = 50.89 \angle -100.75°$$

② $S_1 = 1.2k - j0.9k = V \times I_1^*$

$$I_1^* = \frac{1.5k \angle 36.87°}{-j100} = 15 \angle 53.13°.$$

$$I_1 = 15 \angle -53.13°.$$

$I_0 = I_1 + I_2 = 50.89 \angle -100.75° + 15 \angle -53.13° = 62 \angle -90.45°.$