**Problem 1**

(a) Find $I_L$.

(b) Find $S_L$ (the complex power of the load).

(c) Find $S_{Line}$.

(d) Find $S_{Source}$.

**Problem 2**

(a) Find $S_L$ and $Q_L$ using the power triangle.

(b) Find $I_L$.

(c) Find $S_{Line}$.

(d) Find $S_{Source}$, where the source is the independent source plus the 4Ω resistor.

(e) Find $V_S$.
**PROBLEM 3**

(a) Draw the power triangle for \(L_1\). Find \(S_{L_1}\).

(b) Draw the power triangle for \(L_2\). Find \(S_{L_2}\).

(c) Find \(I_L\).

(d) Find \(S_{LINE}\).

\[L_1: \text{Average power is 12 kw at a power factor of 0.85 leading.}\]

\[L_2: \text{A resistor of 50Ω in series with a 25μF capacitor. The source has a frequency of 60Hz.}\]

**PROBLEM 4**

(a) Find the power factor of \(L_2\).

(b) Find the power factor of the combined load, \(L_1\) in parallel with \(L_2\).

(c) Draw the power triangle for the combined load.

(d) Add a capacitor to the load to correct the combined load PF to 0.97 lagging. What is \(C\)?

\[L_1: \text{Has lagging power factor of 0.6 and 30 kvar reactive power.}\]

\[L_2: \text{Has an impedance of \((12-j18)Ω\).}\]
PROBLEM 5

(a) If \(|I_L| = 35\text{ A}_{\text{rms}}\) what is \(C_1\) for the \(\text{pf}\) of the load \((C_1 \text{ and } L_1)\) to be corrected to \(\text{pf} = 0.93\) lagging?

(b) Draw the power triangle for the combined load and show: \(S_L\), \(P_L\), and \(Q_L\). Also give \(S_L\) in polar notation.

PROBLEM 6

Convert \(-6 - 3j\) to polar notation.