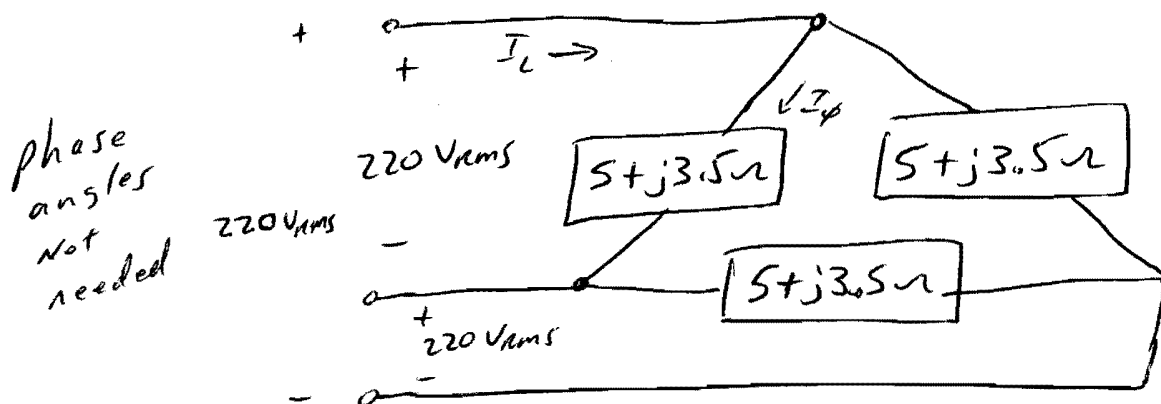


2-1 Three impedances of $4 + j3 \Omega$ are Δ connected and tied to a three-phase 208-V power line. Find I_ϕ , I_L , P , Q , S , and the power factor of this load.

➤ **modified** so that the load impedances are $5 + j3.5 \Omega$ and the power lines are 220 V_{rms}.



$$I_\phi = \frac{V_\phi}{Z_\phi} = \frac{220}{\sqrt{5^2 + 3.5^2}} = \frac{220}{6.103} = \underline{\underline{36.046 \text{ A}_{\text{rms}}}}$$

$$I_L = \sqrt{3} I_\phi = \sqrt{3} (36.046) = \underline{\underline{62.434 \text{ A}_{\text{rms}}}} \quad (2-15)$$

$$\bar{Z}_\phi = \bar{Z}_\Delta = 5 + j3.5 \Omega = 6.1033 \angle 34.992^\circ \Omega \Rightarrow \theta_z = 34.992^\circ$$

$$(2-23) \quad P = 3 V_\phi I_\phi \cos \theta = 3(220)(36.046) \cos 34.992^\circ$$

$$P = \underline{\underline{19,489.8 \text{ W} = 19.49 \text{ kW}}}$$

$$(2-24) \quad Q = 3 V_\phi I_\phi \sin \theta = 3(220)(36.046) \sin 34.992^\circ$$

$$Q = \underline{\underline{13,642.9 \text{ VAR} = 13.64 \text{ kVAR}}}$$

$$(2-25) \quad S = 3 V_\phi I_\phi = 3(220)(36.046) = \underline{\underline{23,790 \text{ VA} = 23.79 \text{ kVA}}}$$

$$\text{PF} = \cos \theta = \cos 34.992^\circ = \underline{\underline{0.8192 \text{ lagging} (Q > 0)}}$$