



for  $Z_1$   $\begin{cases} P = 500W \\ pf = 0.8 \text{ lagging} \end{cases}$

for  $Z_2$   $\begin{cases} P = 1000W \\ pf = 0.9 \text{ lagging} \end{cases}$

for  $Z_3$   $\begin{cases} P = 1500W \\ pf = 0.95 \text{ leading} \end{cases}$

$$|I_1| = \frac{500}{115 \times 0.8} = 5.435; \quad \theta = \cos^{-1} 0.8 = 36.87^\circ$$

$$\therefore \underline{\hat{I}_1} = 5.435 e^{-j36.87^\circ}$$

$$\underline{\hat{I}_2} = \frac{1000}{115 \times 0.9} e^{-j\cos^{-1}(0.9)} = 9.66 e^{-j25.84^\circ}$$

$$\underline{\hat{I}_3} = \frac{1500}{830 \times 0.95} e^{+j\cos^{-1}(0.95)} = 6.865 e^{+j18.19^\circ}$$

$$\underline{\hat{I}_{s1}} = \underline{\hat{I}_1} + \underline{\hat{I}_3} = 4.348 - j3.241 + 6.522 + j2.143$$

$$\underline{\hat{I}_{s1}} = \boxed{10.87 - j1.118} = 10.92 e^{-j5.27^\circ}$$

$$\underline{\hat{I}_{s2}} = \underline{\hat{I}_2} + \underline{\hat{I}_3} = 8.694 - j4.21 + 6.522 + j2.143 = 15.22 - j2.07$$

$$\underline{\hat{I}_{s2}} = 15.36 e^{-j7.75^\circ}$$