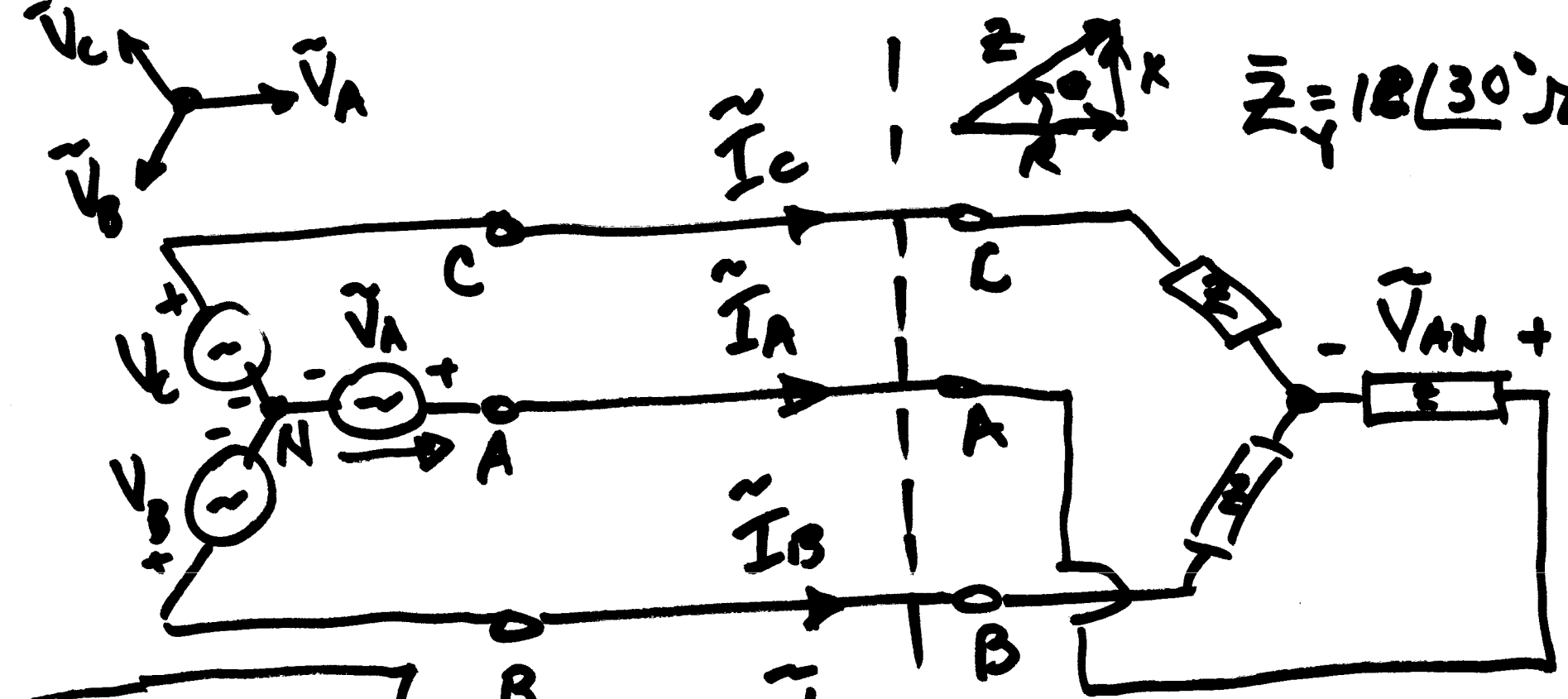


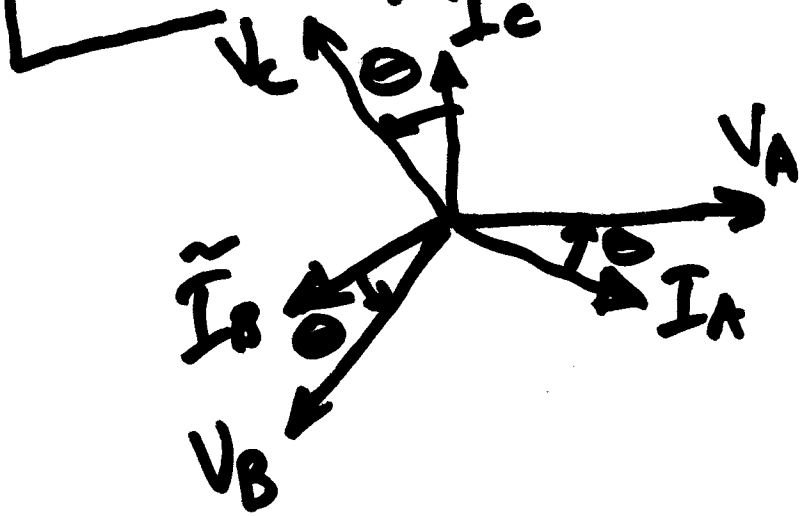
$V_\phi = 120\ V$

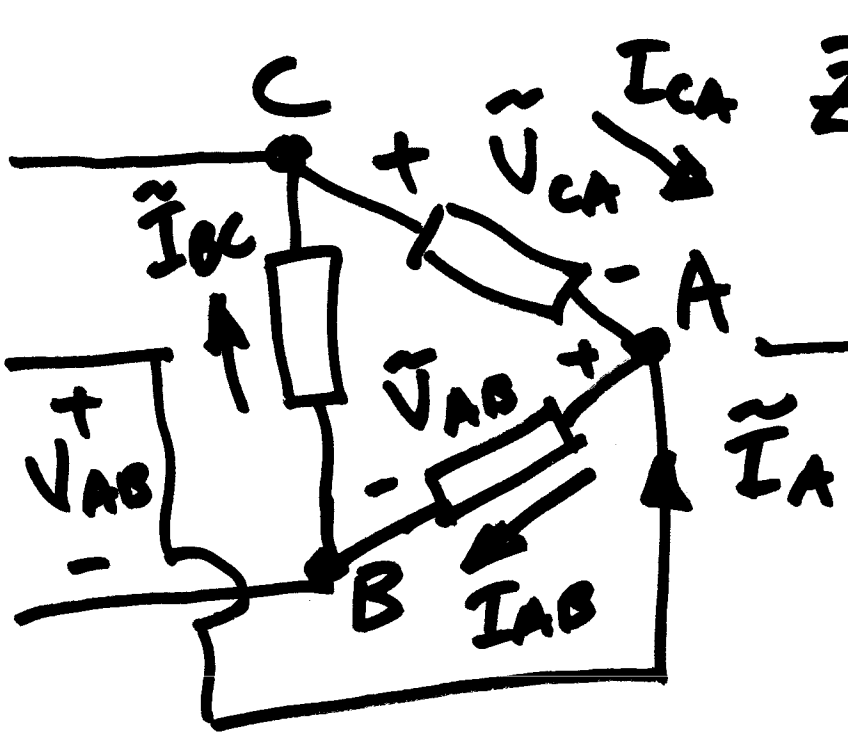
$= V_{LN}$

$$\tilde{I}_A = \frac{\tilde{V}_{AN}}{\bar{Z}}$$

$$= 10\angle -30^\circ\ A$$

$$\bar{S}_{3\phi} = \underline{\underline{\tilde{V}_A \tilde{I}_A^* \times 3}}$$





$\bar{Z}_\Delta = 36\angle 30°$

$Z_\Delta = 3 Z_Y$

KCL @ node A

$V_\phi = V_{LL}$

$$\tilde{I}_{AB} = \frac{\tilde{V}_{AB}}{\bar{Z}_\Delta} = \frac{208\angle 30°}{36\angle 30°}$$

$$\tilde{I}_{CA} = \frac{\tilde{V}_{CA}}{\bar{Z}_\Delta} = \frac{208\angle 150°}{36\angle 30°}$$

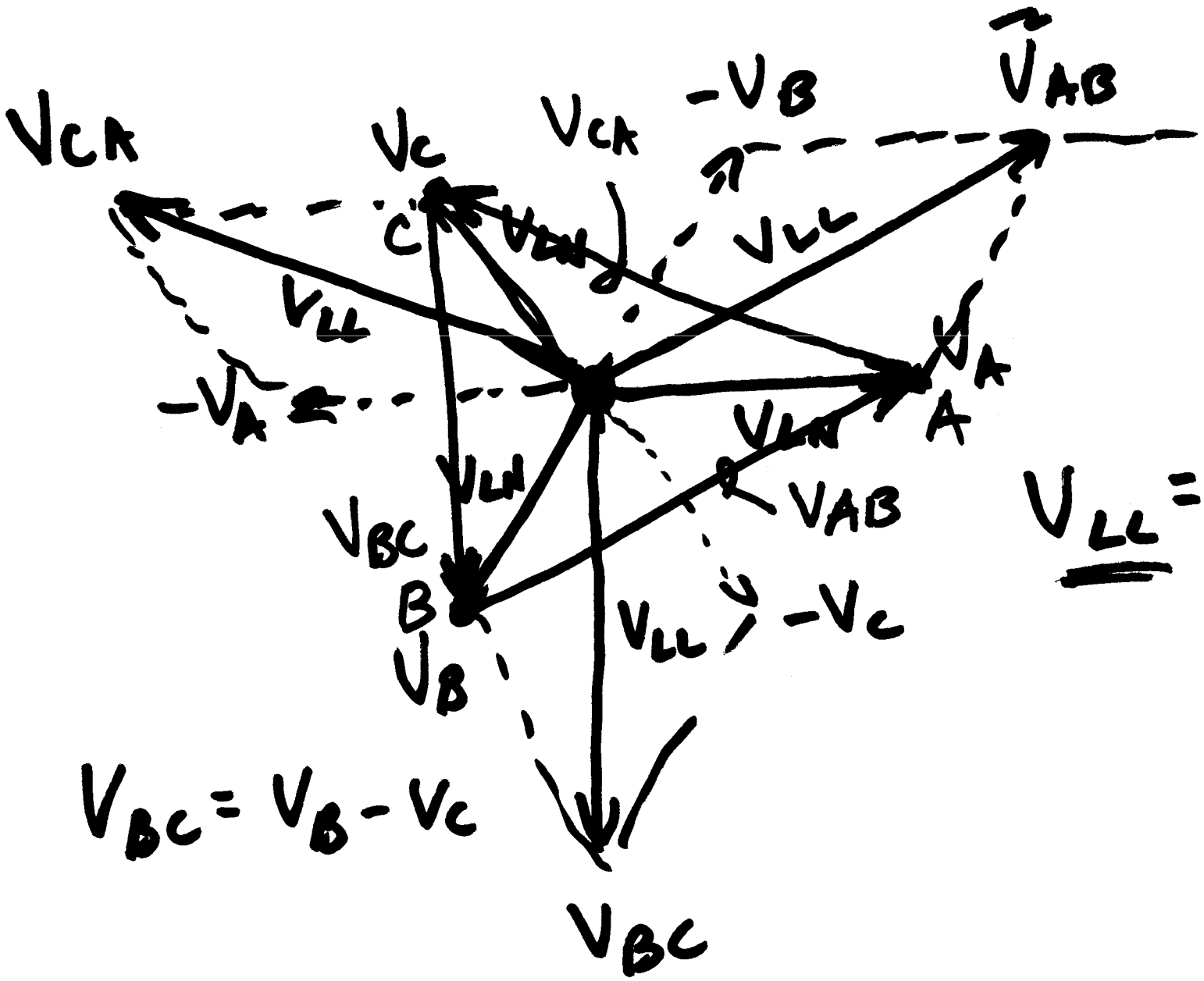
$$\tilde{I}_A = \tilde{I}_{AB} - \tilde{I}_{CA}$$

$$= 5.778\angle 0° - 5.778\angle 120°$$

$$= \underline{10\angle -30° \text{ A}}$$

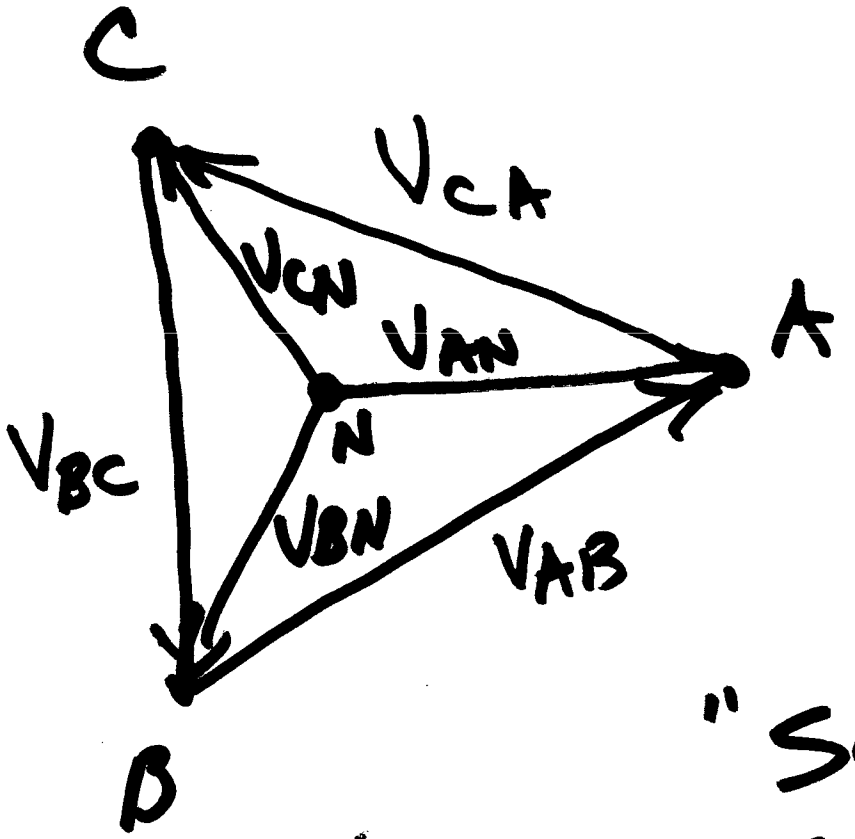
$V_{CA} = V_C - V_A$

$\tilde{V}_{AB} = \tilde{V}_A - \tilde{V}_B$

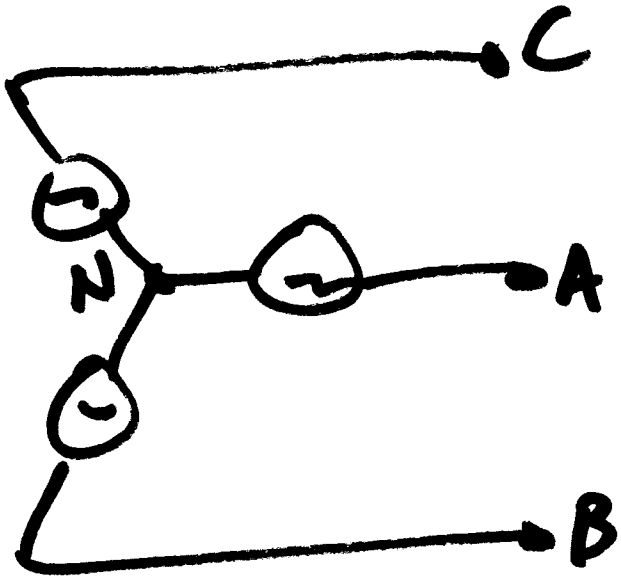


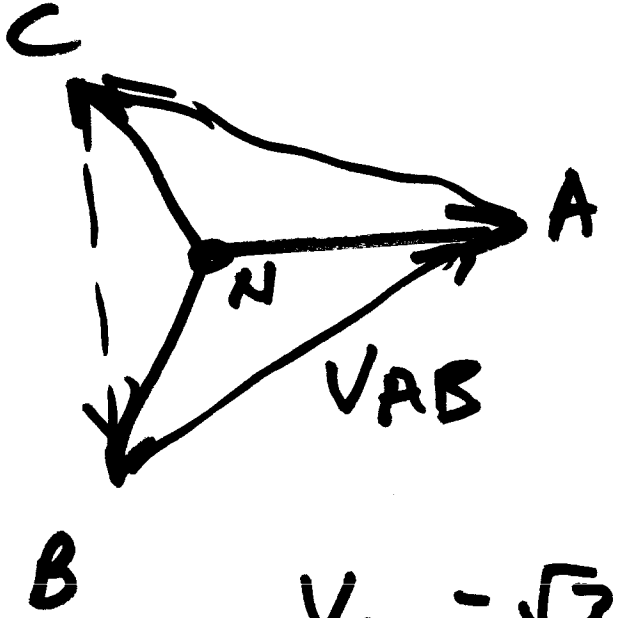
$V_{BC} = V_B - V_C$

$\underline{\underline{V_{LL} = \sqrt{3}\, V_{LN}}}$



"Source Conversion"

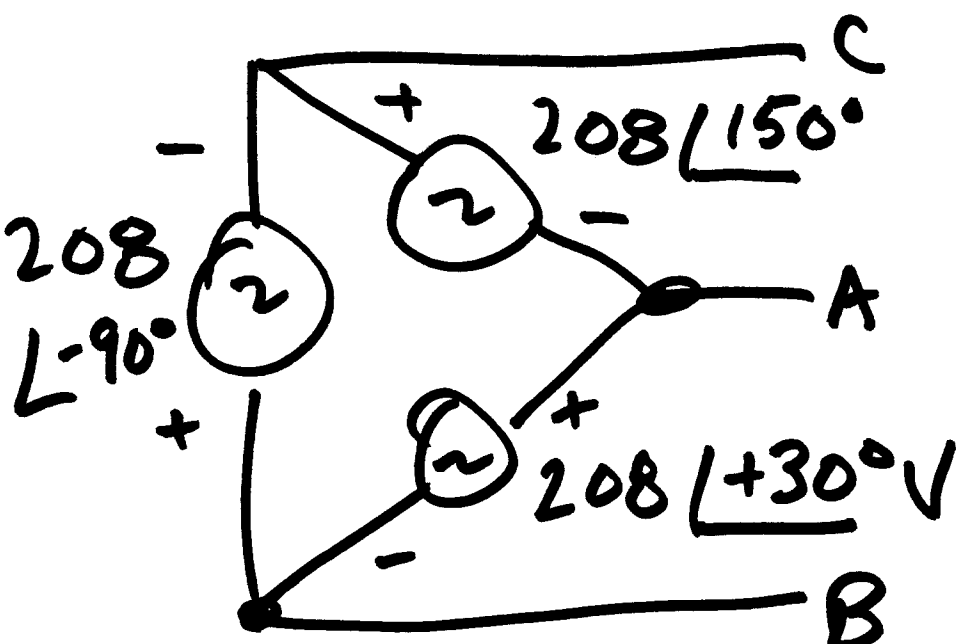


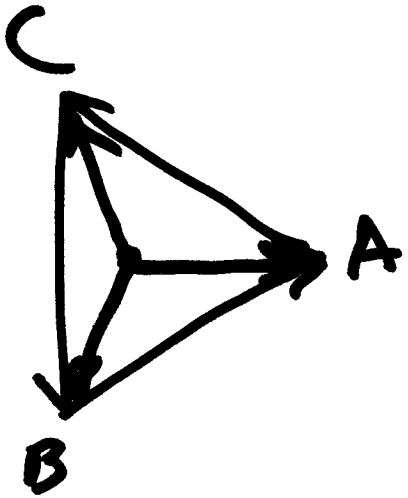


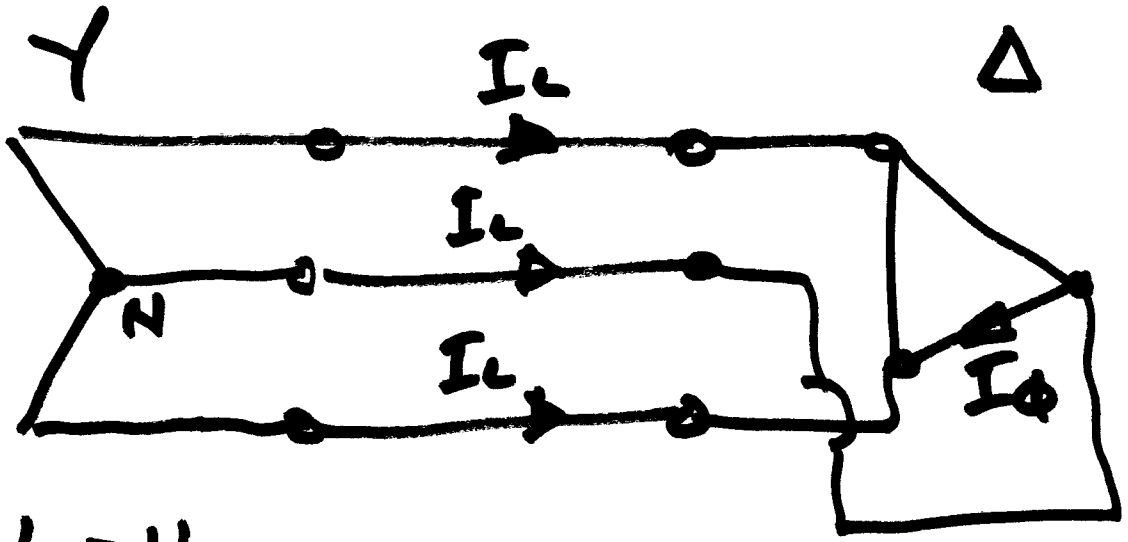
$$V_{LL} = \sqrt{3}\,120$$

$$= \sqrt{3}(120)$$

$$V_{LL} = 208\,V$$







$V_\phi = V_{LN}$

$I_\phi = I_L$

$V_\phi = V_{LL}$

$I_\Delta = I_\phi = I_L/\sqrt{3}$

Be specific!

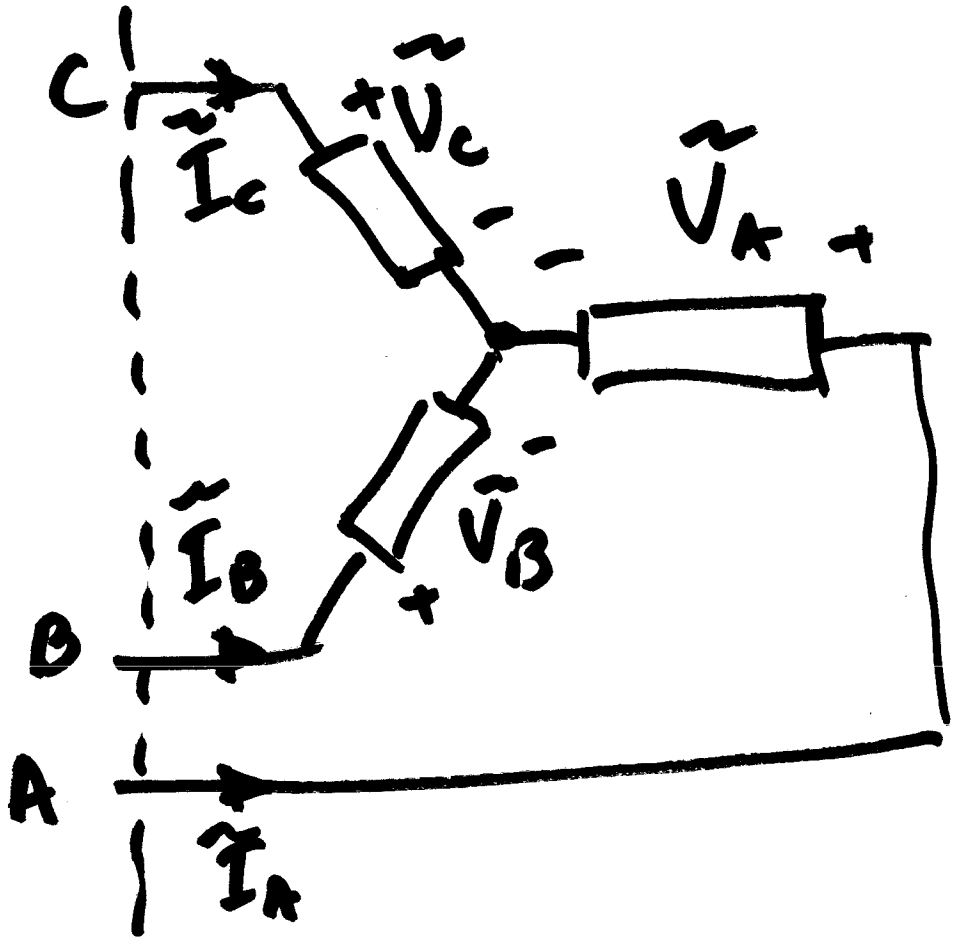
V_{LN}

V_{LL}

I_L

I_Δ

Phase qty's depend on whether Y or Δ!



$$\tilde{S}_{3\phi} = \tilde{V}_A \tilde{I}_A^* + \tilde{V}_B \tilde{I}_B^* + \tilde{V}_C \tilde{I}_C^*$$

$$= 3\, \tilde{V}_A \tilde{I}_A^*$$

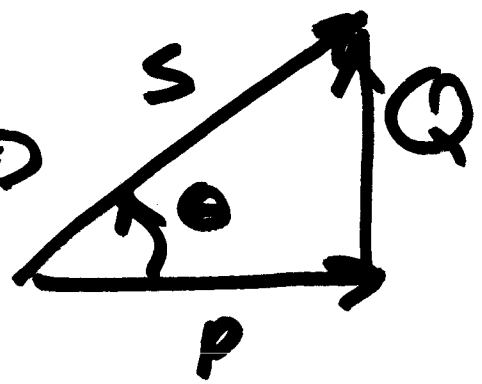
$$= \left[V_A I_A \cos\theta + j V_A I_A \sin\theta \right] 3$$

$$P + jQ$$

$$= 3\left[V_{LN} I_L \cos\theta + j V_{LN} I_L \sin\theta\right]$$

$$V_{LN} = \frac{V_{LL}}{\sqrt{3}}$$

Total 3φ $\bar{S}$ $\Rightarrow$

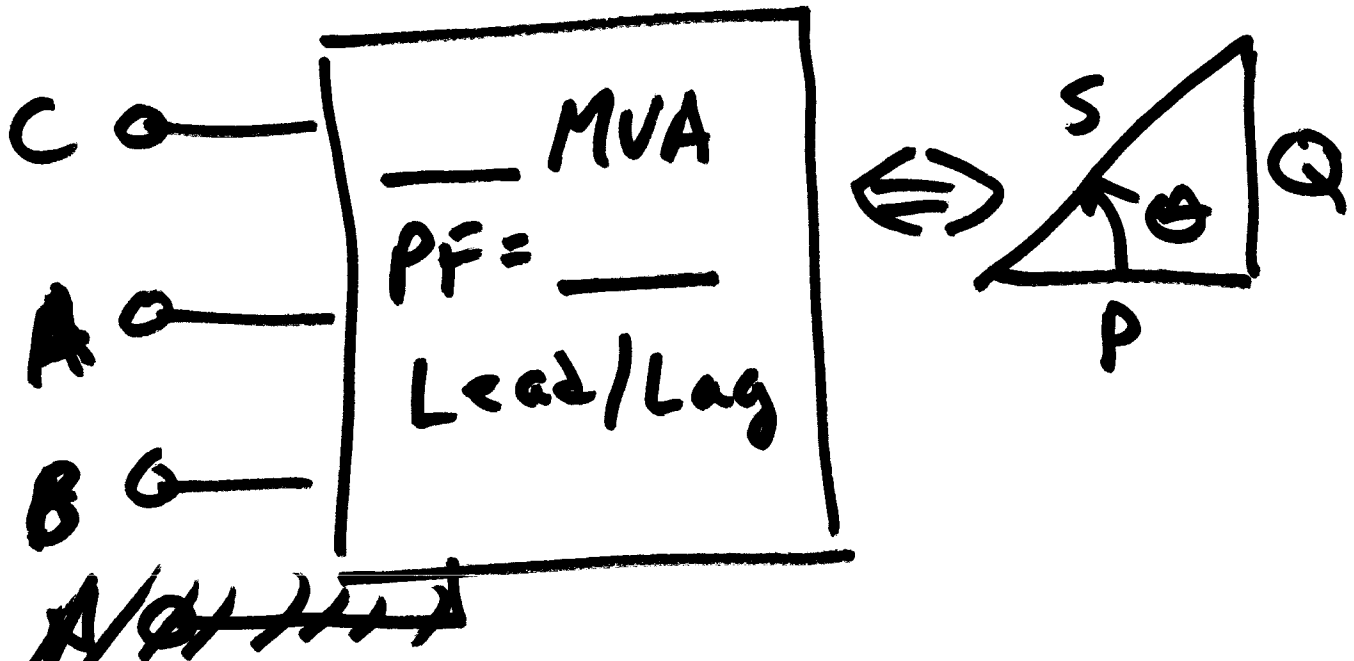


$$= \sqrt{3}\left[V_{LL} I_L \cos\theta + j V_{LL} I_L \sin\theta\right]$$

$$P_{3\phi} = \sqrt{3}\, V_{LL} I_L \cos\theta$$

$$Q_{3\phi} = \sqrt{3}\, V_{LL} I_L \sin\theta$$

$$S_{3\phi} = \sqrt{3}\, V_{LL} I_L$$



BLACK BOX LOAD

N not shown for balanced 3ph Load....

- Double subscripts
- Φ qty's