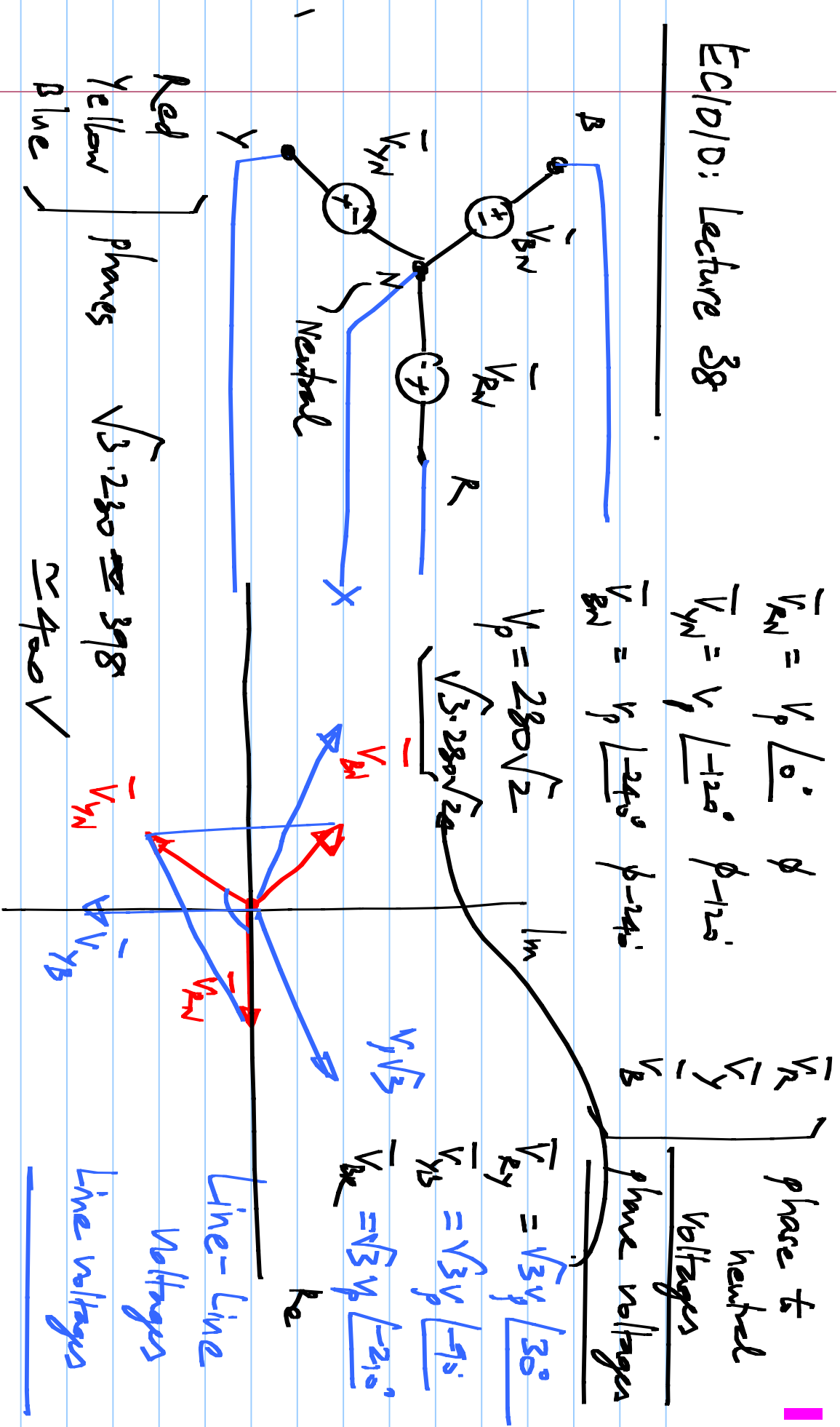
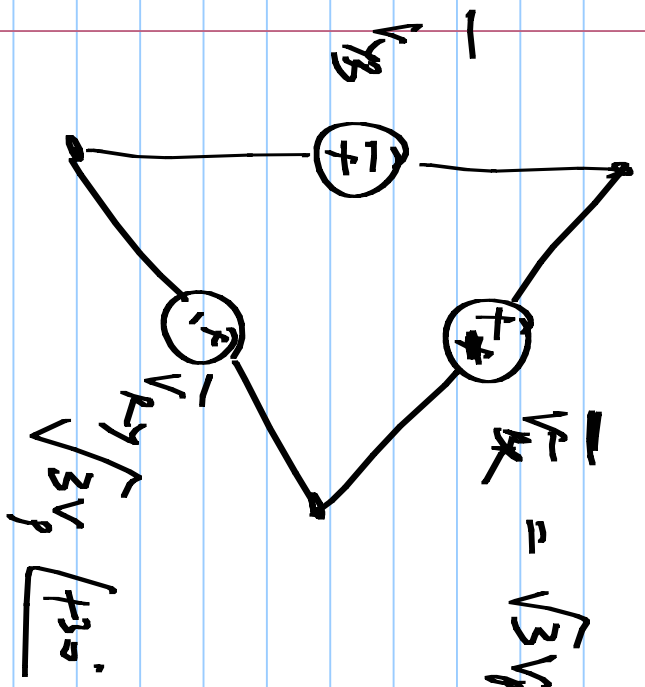


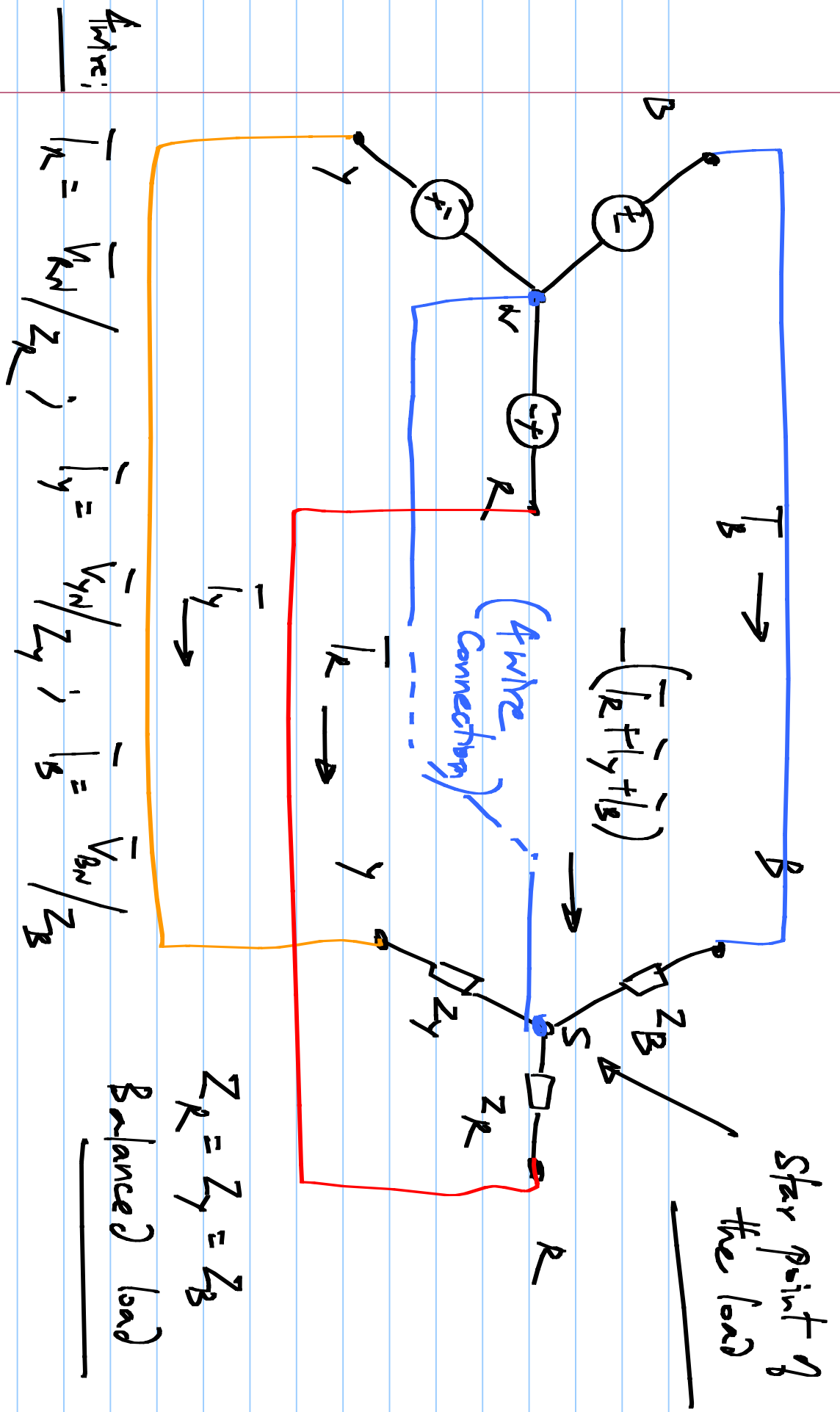
EC1010: Lecture 38



Loop of voltage sources

$$\vec{V}_R = \sqrt{3}V_p \angle -24^\circ$$





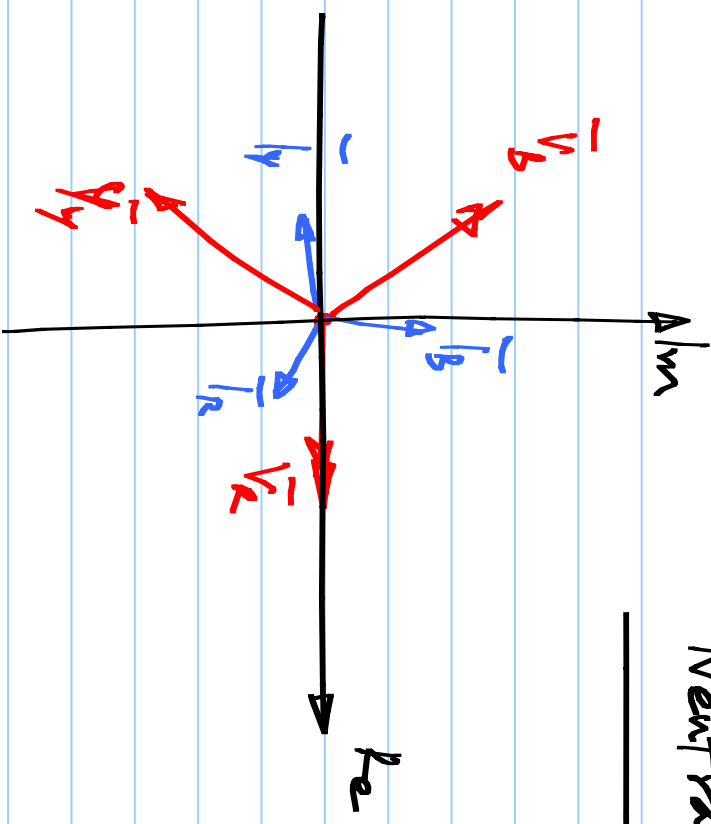
Assume:

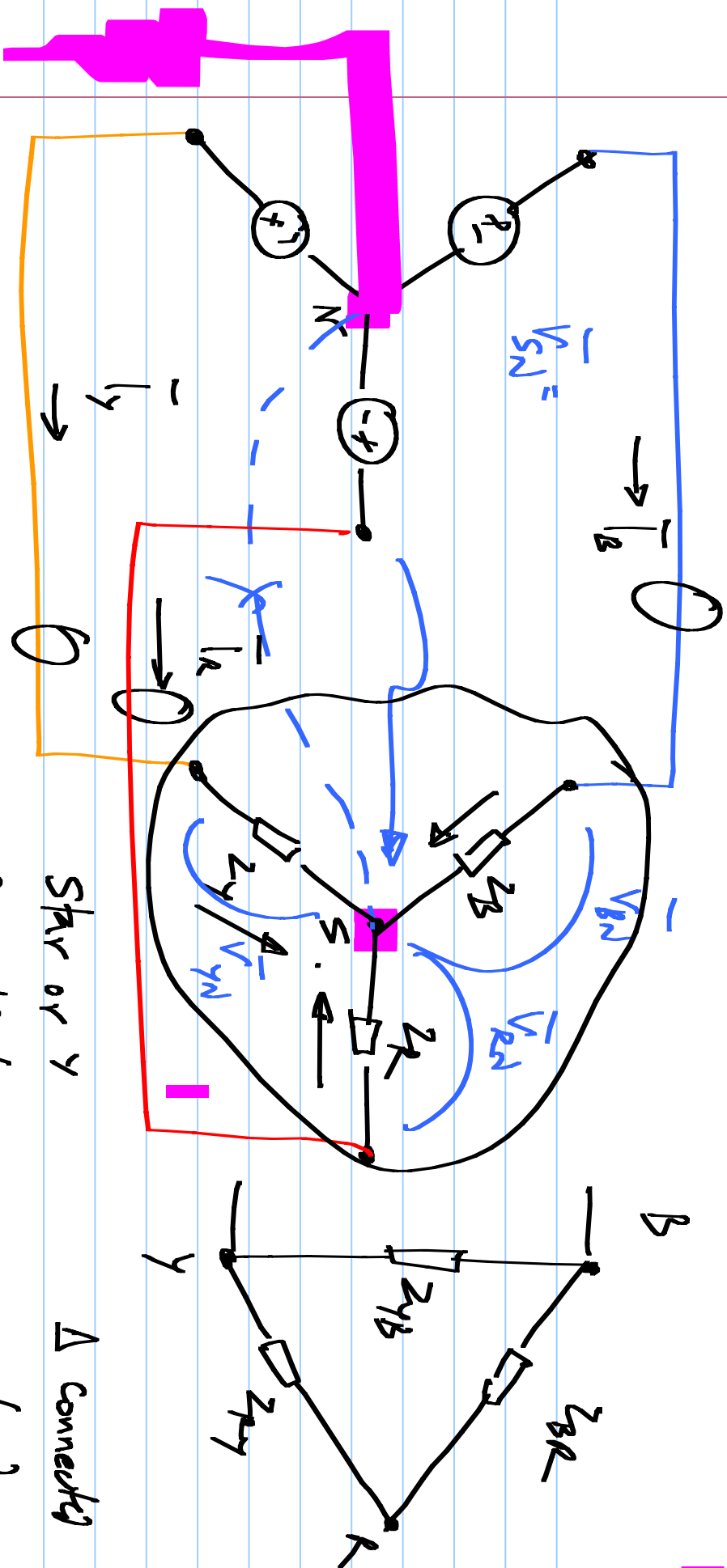
$$I_R = \frac{V_{RN}}{Z_R}; \quad I_Y = \frac{V_{YN}}{Z_Y}; \quad I_B = \frac{V_{BN}}{Z_B}$$

$Z_R = Z_Y = Z_B$
Balanced load

Balanced load;

3 wire / 4 wire makes no difference
Neutral current = 0





Line currents = load phase currents

Star or Δ connected load

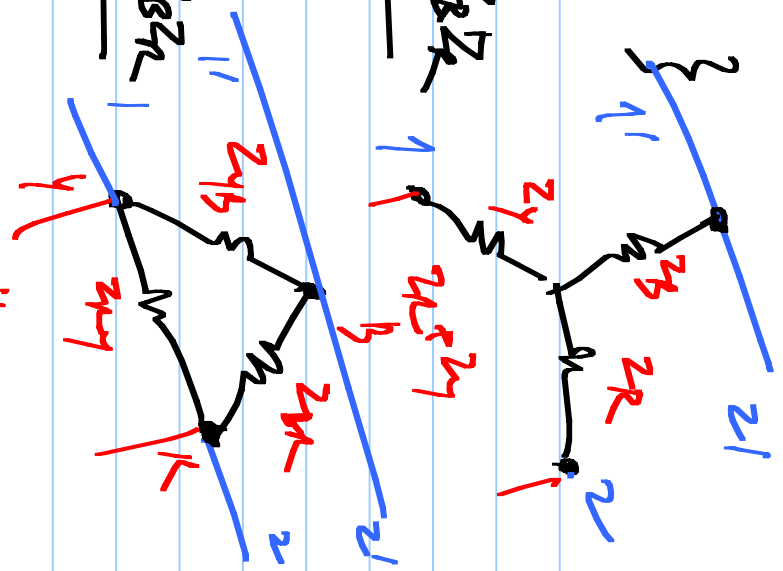
Load phase voltages = line voltages

$$Z_0 = \{Z_1, Z_Y, Z_B\} \quad \{Z_{RY}, Z_B, Z_R\}$$

$$Z_{RY} = \frac{Z_R Z_Y + Z_Y Z_B + Z_B Z_R}{Z_B}$$

$$Z_{YB} = \frac{Z_0 Z_Y + Z_Y Z_B + Z_B Z_R}{Z_R}$$

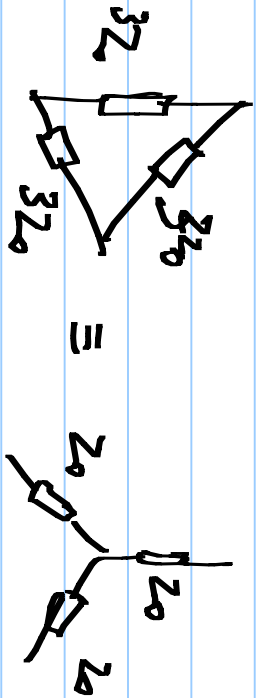
$$Z_{BR} = \frac{Z_Y Z_Y}{Z_Y}$$



$$Z_R = \frac{Z_{BR} Z_{RY}}{Z_{RY} + Z_{YB} + Z_{BR}}$$

$$Z_Y = \frac{Z_{YB} Z_{RY}}{Z_{RY} + Z_{YB} + Z_{BR}}$$

$$Z_B = \frac{Z_{YB} Z_{RY}}{Z_{RY} + Z_{YB} + Z_{BR}}$$



$$\left(\Sigma \right)$$

