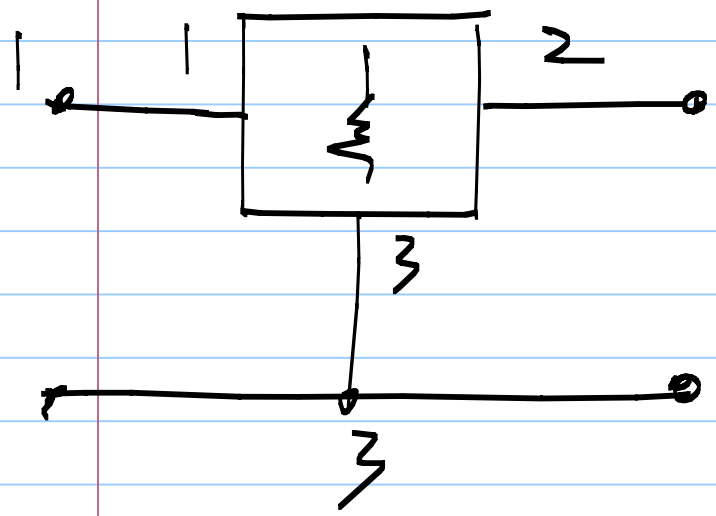
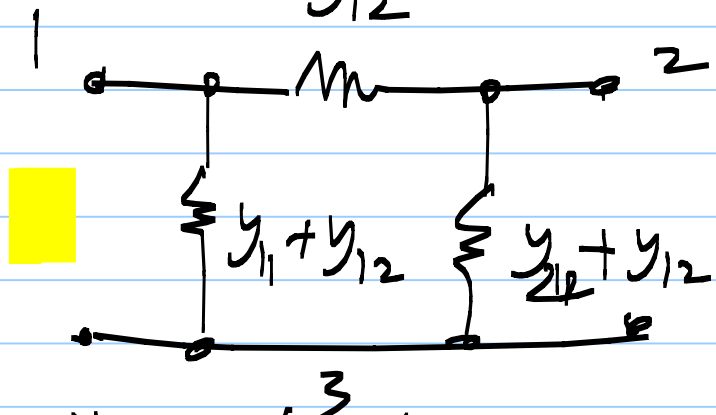
EE 2015

11/9/2017

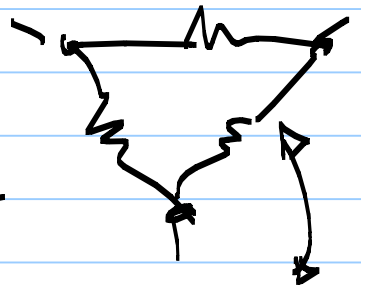


≡

Π - network

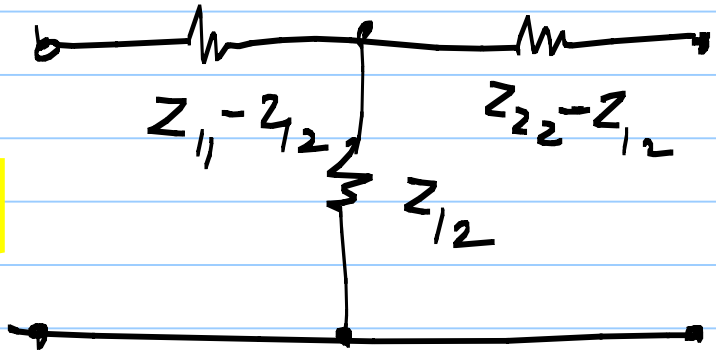


Δ-network

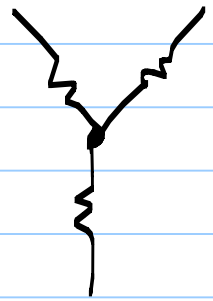


≡

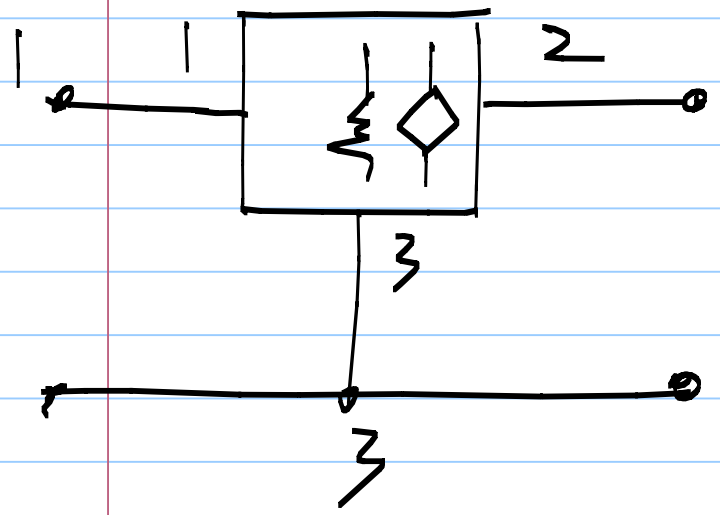
T - network



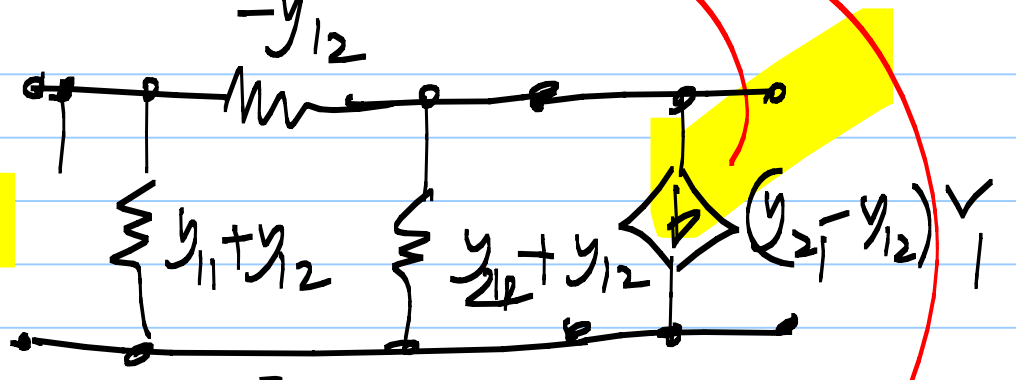
star-network



Makes [y] or [z] symmetric



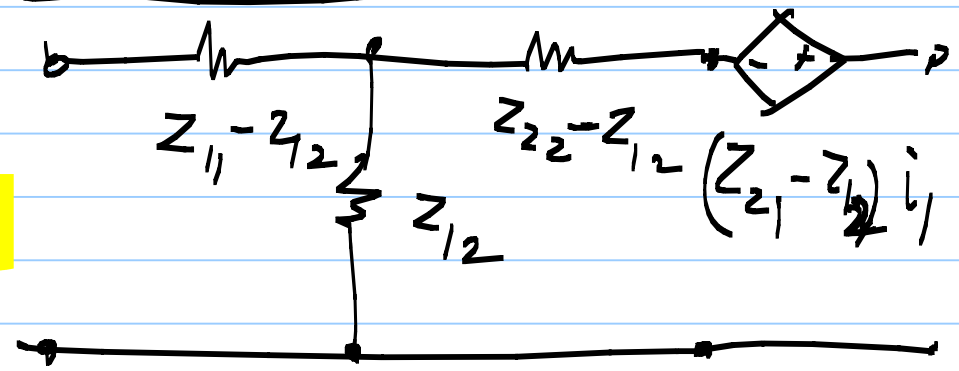
≡

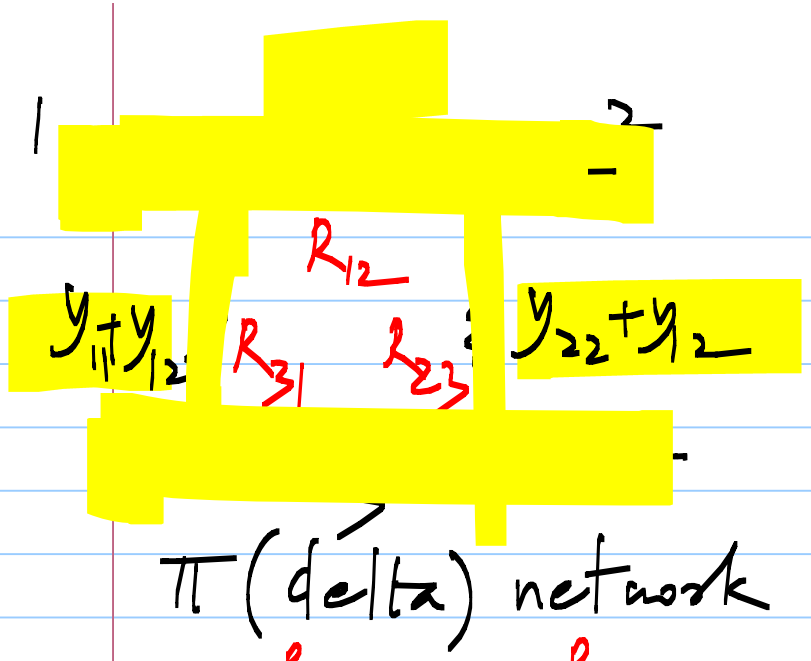


T- network

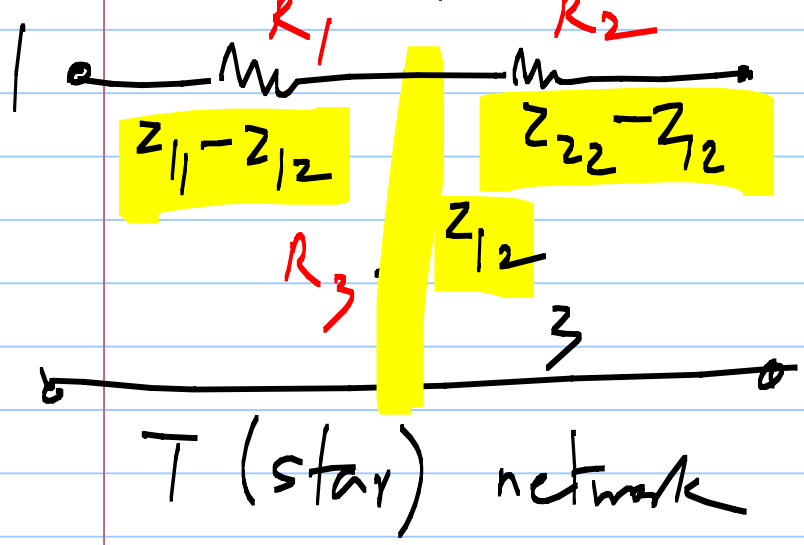
$$\begin{bmatrix} y_{11} & y_{12} \\ y_{21} & y_{22} \end{bmatrix}$$

≡





π (delta) network



T (star) network

Star ⟷ Delta

$$R_{12}, R_{23}, R_{31} \rightleftarrows R_1, R_2, R_3$$

$$R_{12} = \frac{1}{-y_{12}} = \frac{z_{11}z_{22} - z_{12}^2}{z_{12}}$$

R_{31} | R_{23}

$$= \frac{(R_1+R_3)(R_2+R_3) - R_3^2}{R_3}$$

$$= \frac{R_1R_2 + R_2R_3 + R_3R_1}{R_3}$$

R_3 R_2 R_1

Star → Delta

$$R_{12} = \frac{R_1R_2 + R_2R_3 + R_3R_1}{R_3}$$

$$R_{23} = \frac{R_1R_2 + R_2R_3 + R_3R_1}{R_1}$$

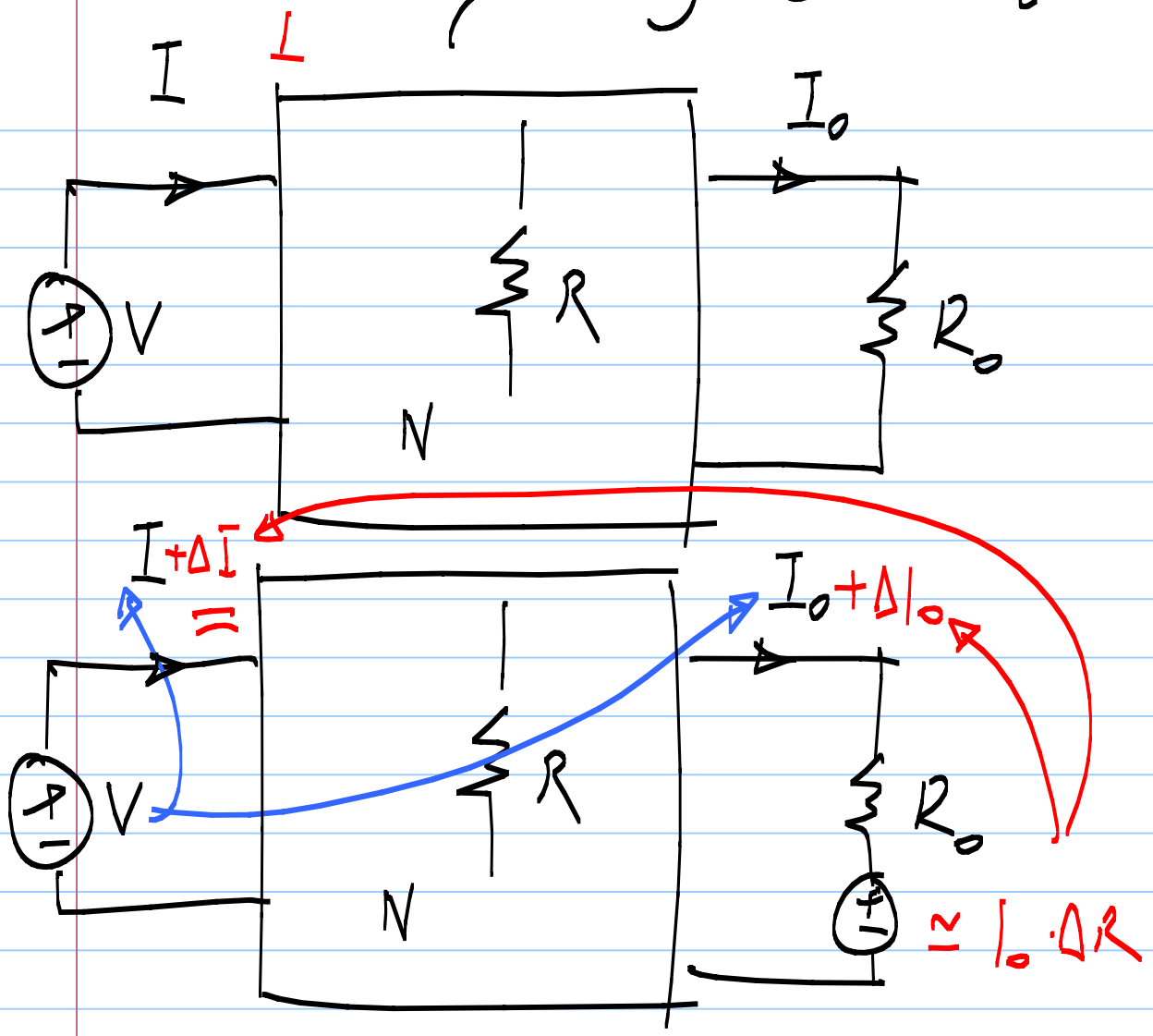
$$R_{31} = \frac{R_1R_2 + R_2R_3 + R_3R_1}{R_2}$$

$$R_3 = z_{12} = \frac{-y_{12}}{y_{11}y_{22} - y_{12}^2}$$

$$= \frac{\left(1/R_{12}\right)}{\left(\frac{1}{R_{12}} + \frac{1}{R_{13}}\right)\cdot\left(\frac{1}{R_{12}} + \frac{1}{R_{23}}\right) - \left(\frac{1}{R_{12}}\right)^2}$$

$$= \frac{1/R_{12}}{\frac{1}{R_{13}}\cdot\frac{1}{R_{12}} + \frac{1}{R_{12}}\frac{1}{R_{23}} + \frac{1}{R_{13}R_{23}}}$$

Original circuit solution : available



substitution theorem

Approximation

Reciprocity