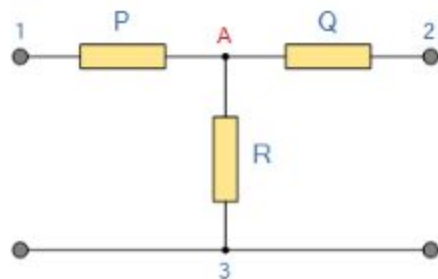
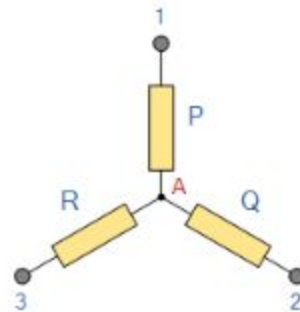


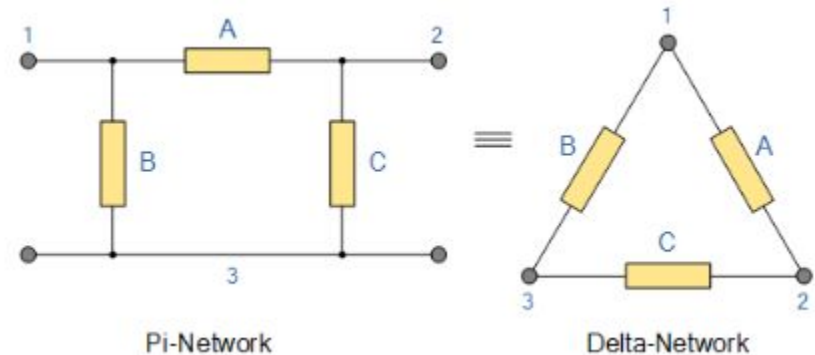
Three branches in an electrical network can be connected in numbers of forms but most common among them is either star or delta form. In delta connection, three branches are so connected, that they form a closed loop. As these three branches are connected nose to tail, they form a triangular closed loop, this configuration is referred as delta connection. On the other hand, when either terminal of three branches is connected to a common point to form a Y like pattern is known as star connection. But these star and delta connections can be transformed from one form to another. For simplifying complex network, delta to star or **star to delta transformation** is often required.



T-Network

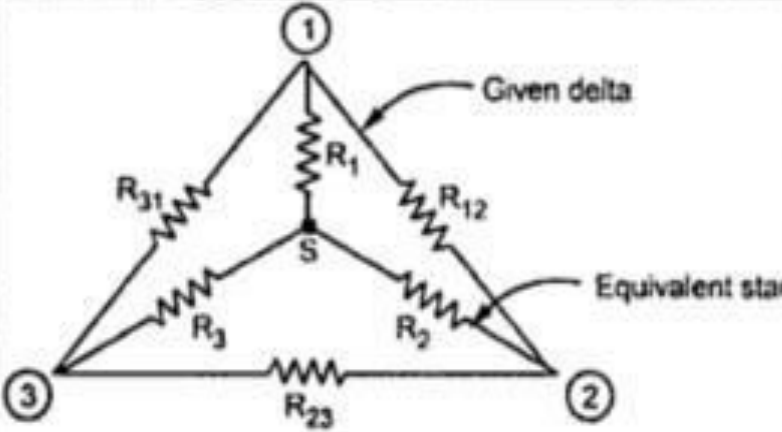
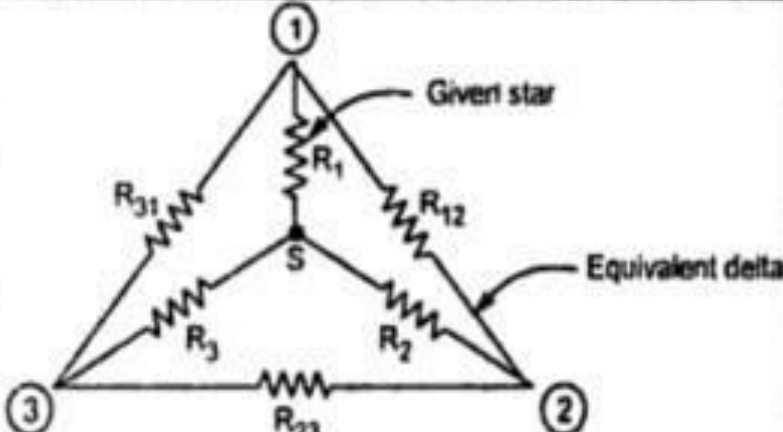


Star-Network

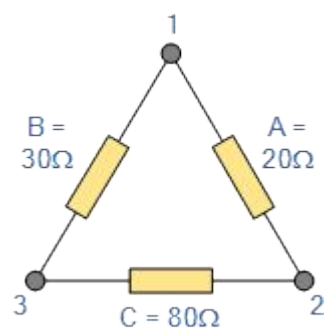


Pi-Network

Delta-Network

Delta-Star	Star-Delta
	
$R_1 = \frac{R_{12}R_{31}}{R_{12} + R_{23} + R_{31}}$	$R_{12} = R_1 + R_2 + \frac{R_1 R_2}{R_3}$
$R_2 = \frac{R_{12}R_{23}}{R_{12} + R_{23} + R_{31}}$	$R_{23} = R_2 + R_3 + \frac{R_2 R_3}{R_1}$
$R_3 = \frac{R_{23}R_{31}}{R_{12} + R_{23} + R_{31}}$	$R_{31} = R_3 + R_1 + \frac{R_1 R_3}{R_2}$

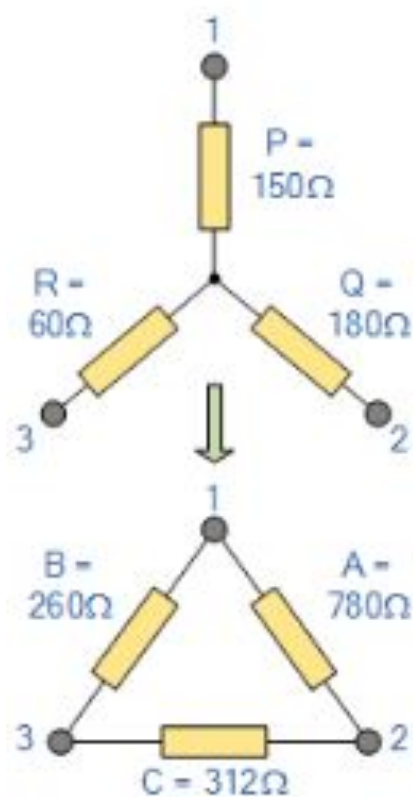
Star-Delta and Delta-Star Transformations



$$Q = \frac{AC}{A+B+C} = \frac{20 \times 80}{130} = 12.31 \Omega$$

$$P = \frac{AB}{A+B+C} = \frac{20 \times 30}{130} = 4.61 \Omega$$

$$R = \frac{BC}{A+B+C} = \frac{30 \times 80}{130} = 18.46 \Omega$$



$$A = \frac{QP}{R} + Q + P = \frac{180 \times 150}{60} + 180 + 150 = 780\Omega$$

$$B = \frac{RP}{Q} + R + P = \frac{60 \times 150}{180} + 60 + 150 = 260\Omega$$

$$C = \frac{QR}{P} + Q + R = \frac{180 \times 60}{150} + 180 + 60 = 312\Omega$$