EEE104
Circuit Analysis I

Ankara University

Faculty of Engineering

Electrical and Electronics Engineering Department

Voltage and Current

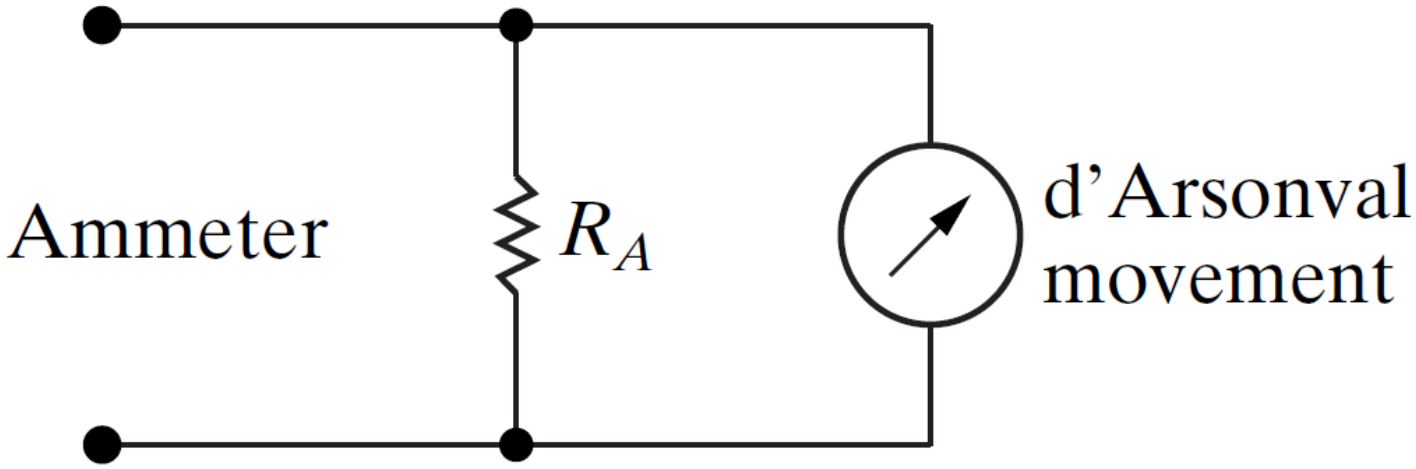
EEE104 Circuit Analysis I

Lecture 5

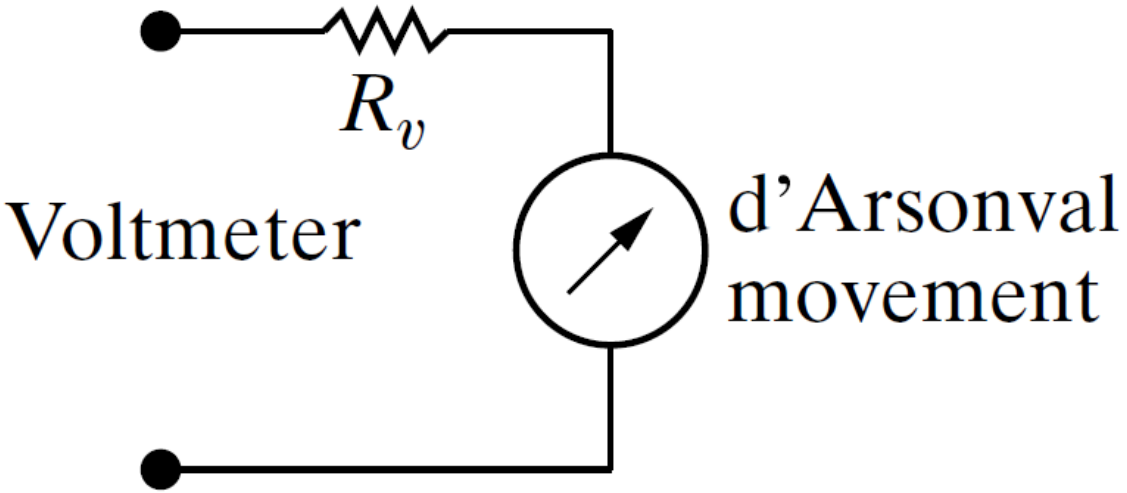
Agenda

- Voltage and Current Measurement
- d’Arsonval Meter Movement
- Resistance Measurement (by Wheatstone Bridge)
- Delta-to-Wye (Pi-to-Tee) Transformation

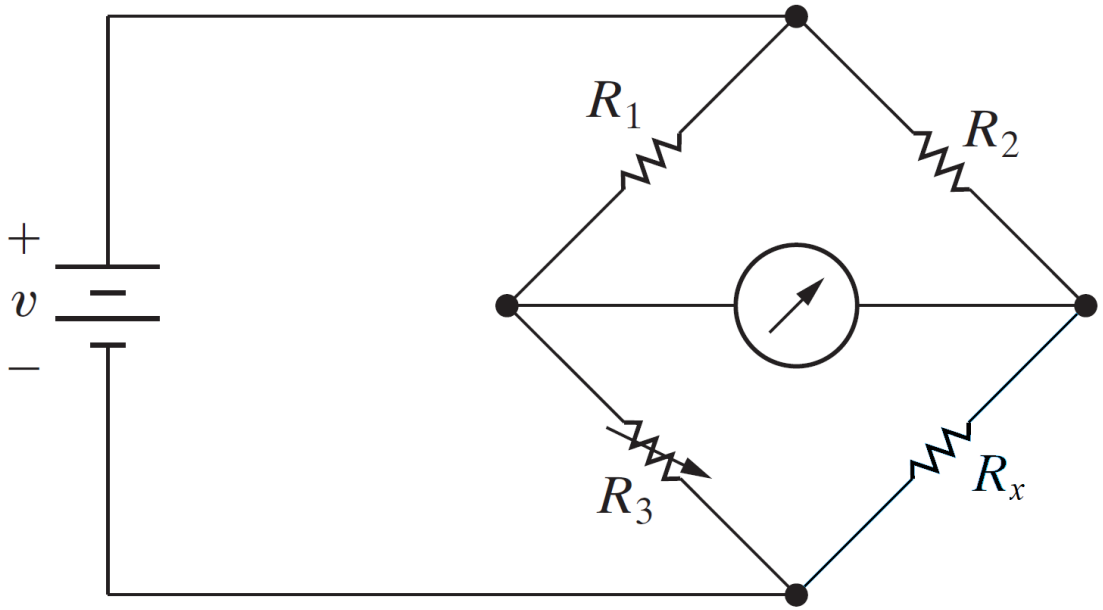
- Ammeter with d'Arsonval Movement



- Voltmeter with d’Arsonval Movement



- Resistance Measurement (by Wheatstone Bridge)

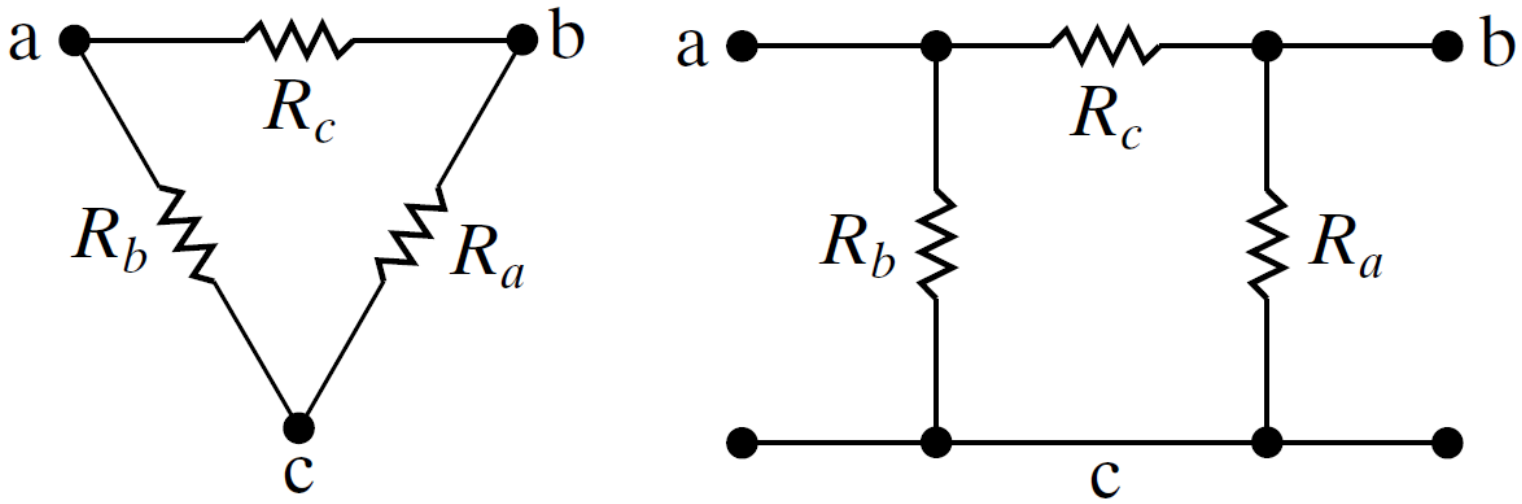


$$R_x = \frac{R_2}{R_1} R_3$$

R_x: Unknown Resistance

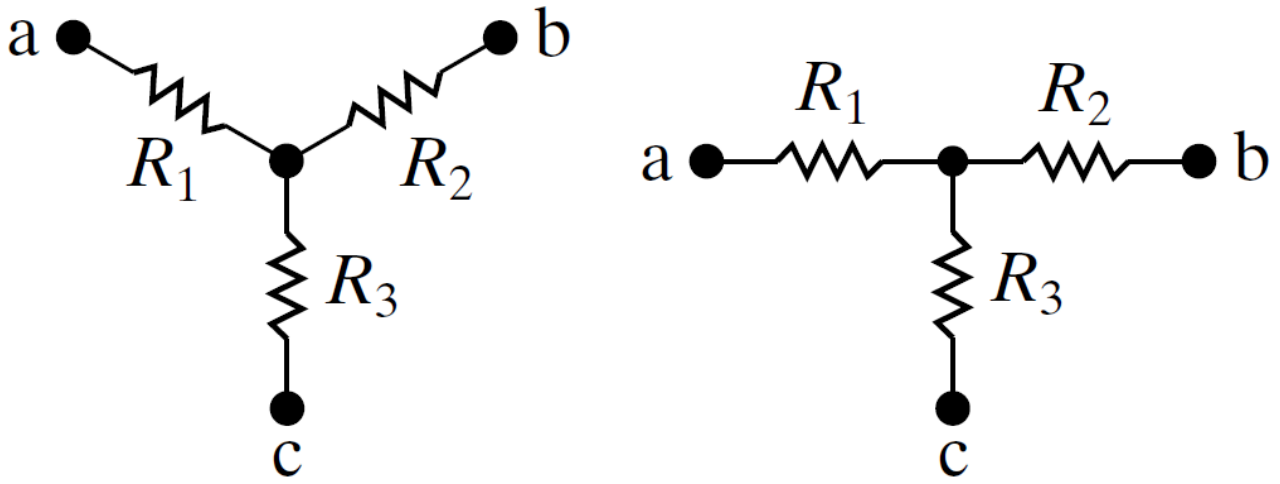
- Delta (Pi) Connection of Resistors

$$\Delta = \pi$$

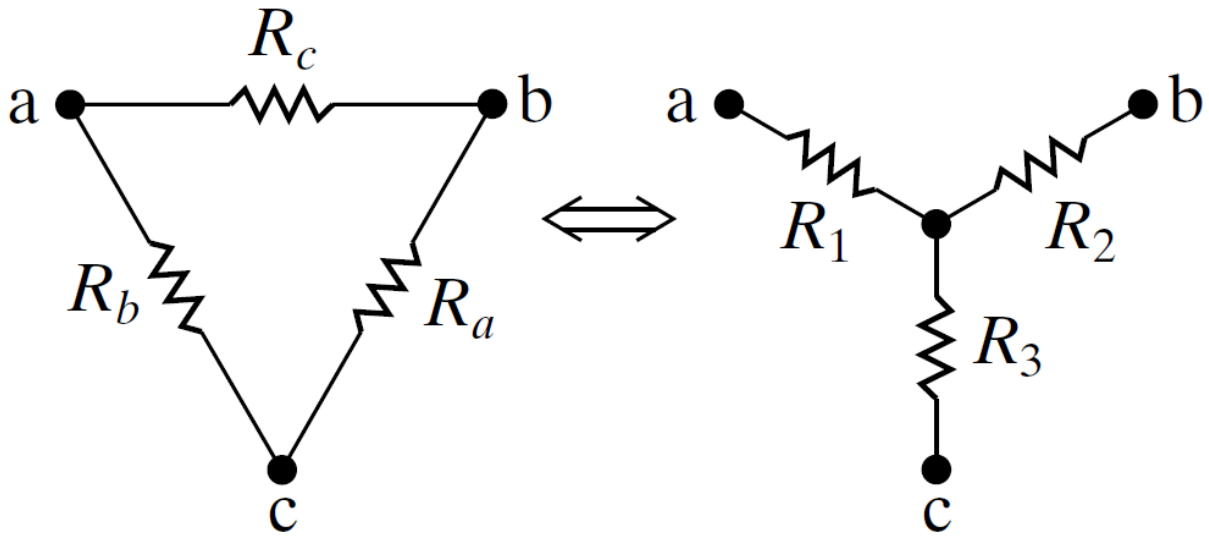


- Wye (Tee) Connection of Resistors

Y = T



- Delta-to-Wye (Pi-to-Tee) Transformation



$$R_a = \frac{R_1R_2 + R_2R_3 + R_3R_1}{R_1}$$

$$R_b = \frac{R_1R_2 + R_2R_3 + R_3R_1}{R_2}$$

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

$$\Updownarrow$$

$$R_1 = \frac{R_b R_c}{R_a + R_b + R_c}$$

$$R_2 = \frac{R_c R_a}{R_a + R_b + R_c}$$

$$R_3 = \frac{R_a R_b}{R_a + R_b + R_c}$$

Reference

- Electric Circuits, Tenth Edition, James W. Nilsson, Susan A. Riedel Pearson, 2015