EEE104
Circuit Analysis I

Ankara University

Faculty of Engineering

Electrical and Electronics Engineering Department

Circuit Variables

EEE104 Circuit Analysis I

Lecture 1

Agenda

- Circuit Variables
- Circuit Theory
- Voltage and Current
- Passive Sign Convention
- Power and Energy

- Electric circuit: Mathematical model of actual electrical system.
- Circuit Theory:
    - Lumped-parameter system
    - Zero net charge
    - No magnetic coupling

Voltage and Current

Voltage: $v = \frac{dw}{dq}$

v: Voltage (Volt)

w: Energy (Joule)

q: Charge (Coulomb)

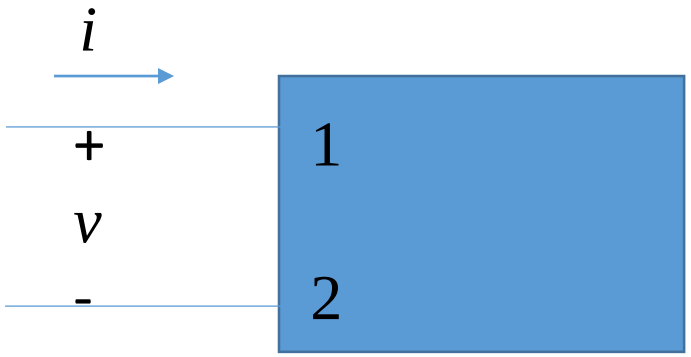
Current:

$$i = \frac{dq}{dt}$$

i: Current (Ampere)

t: Time (second)

Ideal Basic Circuit Element



- Passive Sign Convention:
  - Positive sign for any equation that relates current and voltage if current enters to the terminal with positive sign of voltage,
  - Negative sign, otherwise

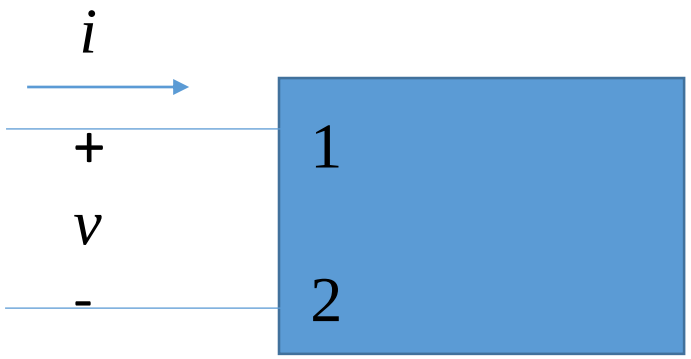
Power and Energy

$$p = \frac{dw}{dt}$$

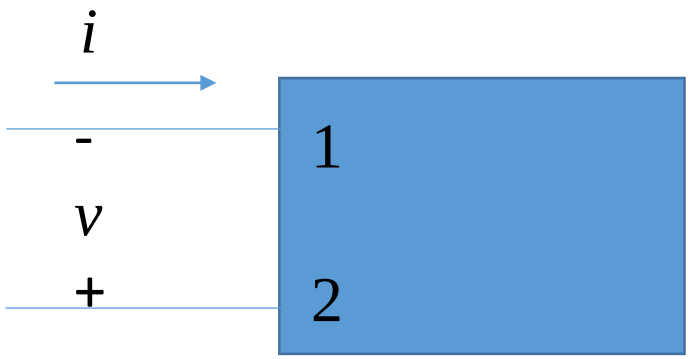
p: Power (Watt)

w: Energy (Joule)

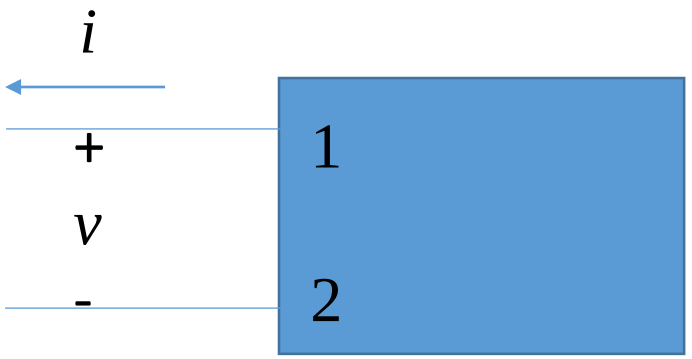
$$p = vi$$



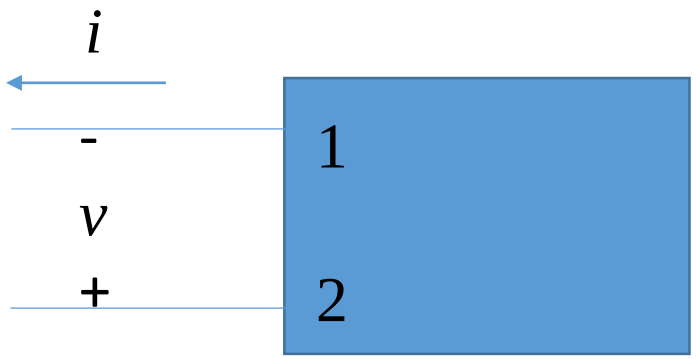
$p=vi$



$p=-vi$



$p=-vi$



$p=vi$

Reference

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