CH1: Circuit Variables

Electric circuit : It is a mathematical model that approximates the behaviour of an actual electric system such as communication, computer, power, or control.

→ The model is employed for analyzing such systems

① Voltage → It is the energy per unit charge created by the separation

$$V = \frac{dW}{dq}$$

W: energy in Joules

q: charge in Coulombs

V: Voltage in Volts

② Current : It is the rate of charge flow

$$i = \frac{dq}{dt}$$ where i is the current in Amperes
t is the time in seconds

③ Power : It is the rate of change of energy

$$P = \frac{dW}{dt}$$

$$V = \frac{dW}{dq} \Rightarrow dW = V\,dq$$

$$\Rightarrow P = \frac{V\,dq}{dt} = V i$$

where P is the power in [Watts].