Electronics & Magnetism

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FYS01a: Physics 1a

This document has used LaTeX in combination with *TikZ* for typesetting.

Contents

1 Fundamental Quanitites

1.1 Charge

Charge is measured in Coulomb (C). In equations, it's often symbolised with q_n.

1.2 Potential Difference

Potential Difference (alterenatively *Voltage*) is the difference in the amount of energy that a charge carrier has between 2 points.

1.3 Flow

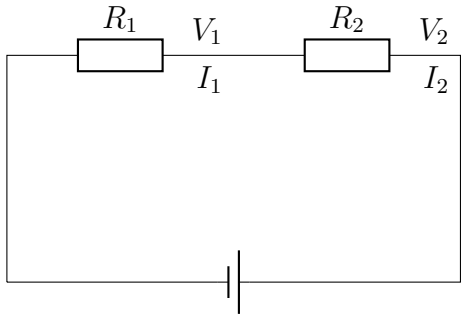
Flow (alterenatively *Amperage*), measured in A (*Amperes*), but in equations denoted as I is the amount of charge moving through a certain cross-section per unit of time.

$$I = C\ s^{-1}$$

2 Circuits & Quanitites

The structure of a circuit affects how the *Voltage* , *Resistance*, & *Amperage* behaves.

2.1 Circuits in series



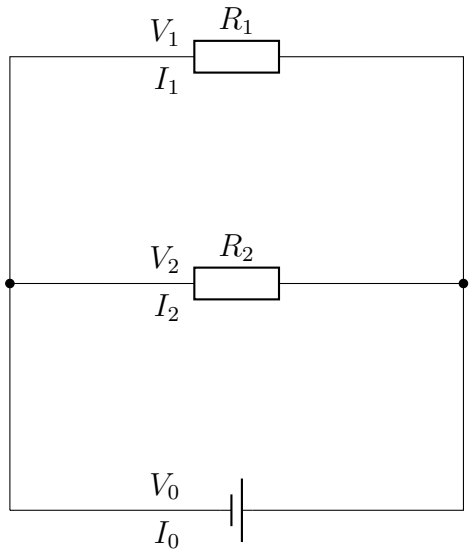
For a circuit connected in series it is true that:

$$R = \sum_{k=1}^{n} R_n$$

$$I = I_1 = I_2 \cdots I_n$$

$$V = \sum_{k=1}^{n} V_n$$

2.2 Circuits in parallel



For a circuit connected in parallel it is true that:

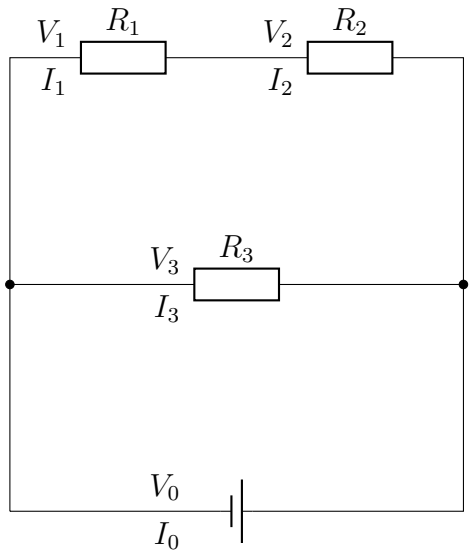
$$\frac{1}{R} = \sum_{k=1}^{n} \frac{1}{R_n}$$

$$I = \sum_{k=1}^{n} I_n$$

$$V = V_1 = V_2 \cdots V_n$$

2.3 Resistor Equivalence

If there is a given circuit where the resistors are connected differently throughout the whole circuit, i.e. There may be two resistors connected in series, connected to a another one in parallel, the rules given in **2.1** and **2.2** may be used to find an equivalent resistor.



Here, one may find an equivalent resistor to R_1 and R_2 using $R = \sum_{k=0}^{n} R_n$. Let the equivalent resistor be R_ϵ:

$$R_\epsilon = R_1 + R_2$$