Statement of hall effect in magnetism

Magnetic field applied normal to current conductor develops voltage across the conductor

Direction of voltage developed in current carrying conductor in hall effect

Perpendicular to both electric and magnetic field

Expression for force due to electric field in hall effect

$$F_e = \frac{eV_h}{d}$$

Condition of equilibrium of electrons in hall effect

Equality of electric and magnetic force

Derivation for expression of hall voltage in hall effect

- $$\frac{eV_h}{d} = Bev_d$$
- $$V_h = Bdv_d$$
- $$I = v_d enA$$
- $$v_d = \frac{I}{enA}$$
- $$v_d = \frac{I}{entd}$$
- $$V_h = Bd\frac{I}{entd}$$
- $$V_h = \frac{BI}{net}$$

Expression for hall voltage in hall effect

$$V_h = \frac{BI}{net}$$

Hall coefficent

Ration of electric field strength produced per unit current density per unit magnetic field

Expression for hall coefficient

$$R_H = \frac{E_H}{\vec{J}\vec{B}}$$

Derivation for expression of hall voltage in terms of number of electrons

- $$R_H = \frac{E_H}{\vec{J}\vec{B}}$$
- $$R_H = \frac{V_H}{d\frac{I}{A}B}$$
- $$R_H = \frac{BI}{net\frac{dIB}{t \times d}}$$
- $$R_H = \frac{1}{ne}$$

Expression for hall voltage in terms of number of electrons

- $$R_H = \frac{1}{ne}$$