Electricity and magnetism

Coulomb's law: $F = k \cdot \frac{q_1 q_2}{r^2} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q_1 q_2}{r^2}$

→ for point charges

acceleration in electric field: $v = \sqrt{\frac{2 \cdot E \cdot d \cdot q}{m}} = \sqrt{\frac{2 \cdot U \cdot q}{m}}$

think: „electric field is like gravitational field" → potential energy

→ energy difference

→ potential (energy) difference (per unit charge) = pd $V = \frac{W}{q}$

power dissipation (in resistor): $P = V \cdot I = I^2 \cdot R = \frac{V^2}{R}$

Kirchoff's laws: $\sum I = 0$ (sum of currents at junction = 0)

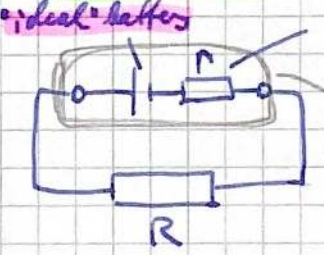
$\sum V = 0$ (sum of voltages in loop = 0)

LDR = light-dependent resistor → light ↑ R ↓

thermistor → temperature ↑ R ↓

resistivity ρ $R = \rho \cdot \frac{l}{A}$ $[\rho] = \Omega m$

electromotive force (emf):



$emf = I \cdot R_{total} = I \cdot (R + r) = IR + Ir$

magnetic field strength / magnetic flux density

$F = BIL \cdot \sin(\theta)$

$[B] = T = \frac{N}{A \cdot m} = \frac{Wb}{m^2}$