Electrical Quantities

- Charge $Q$
- Current $dQ/dt$
- Voltage $V = U/Q$
- Power $P = VI$
Resistance and Ohm’s law

- Ohm’s law $V = IR$
- “Idealized” law
- Resistors in Series: $R_{equiv} = R_1 + R_2 + ...$
- Resistors in Parallel: $1/R_{equiv} = 1/R_1 + 1/R_2 + ...$
Kirchoff’s Current Law

\[ \sum_{n=1}^{N} i_n = 0 \]
Kirchoff’s Voltage Law

\[ \sum_{n=1}^{N} v_n = 0 \]
KVL Example

\[ 6(i_1 + i_2) + 2i_1 - 6 = 0 \]

\[ i_2 = -1 \]
KCL Example: Nodal Analysis

\[
\frac{(6 - V_x)}{6} - \frac{V_x}{2} + 1 = 0
\]