Inductance and Capacitance

Michael Brodskiy
Professor: N. Sun

February 13, 2023

- What is an inductor?
  - An electrical component that opposes change in electric current
    - Unlike a resistor, which opposes the flow of current
  - Made by putting a coil of wire around a magnetic or non-magnetic core
  - Source of inductance is change in magnetic field
  - Current causes magnetic field and change in current causes change in magnetic field, which induces voltage in conductors (inductance)
  - Mathematical Relation

$$\boxed{v = L\frac{di}{dt}}$$

  - L is the inductance and its SI unit is Henry (H)
  - Notice the direction of current and voltage drop
  - Mathematical Relation[1]

$$i(t) = \frac{1}{L}\int_{t_0}^{t} v dt + i(t_0)$$

[1] If voltage is given