Georgia Institute of Technology

Linear Circuits

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An introduction to linear electric circuit elements and a study of circuits containing such devices.

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Inductance

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- *Introduce inductors and describe how they work*
- *Calculate current and voltage for inductors*

Previous Class

- Capacitance
- Capacitors as devices

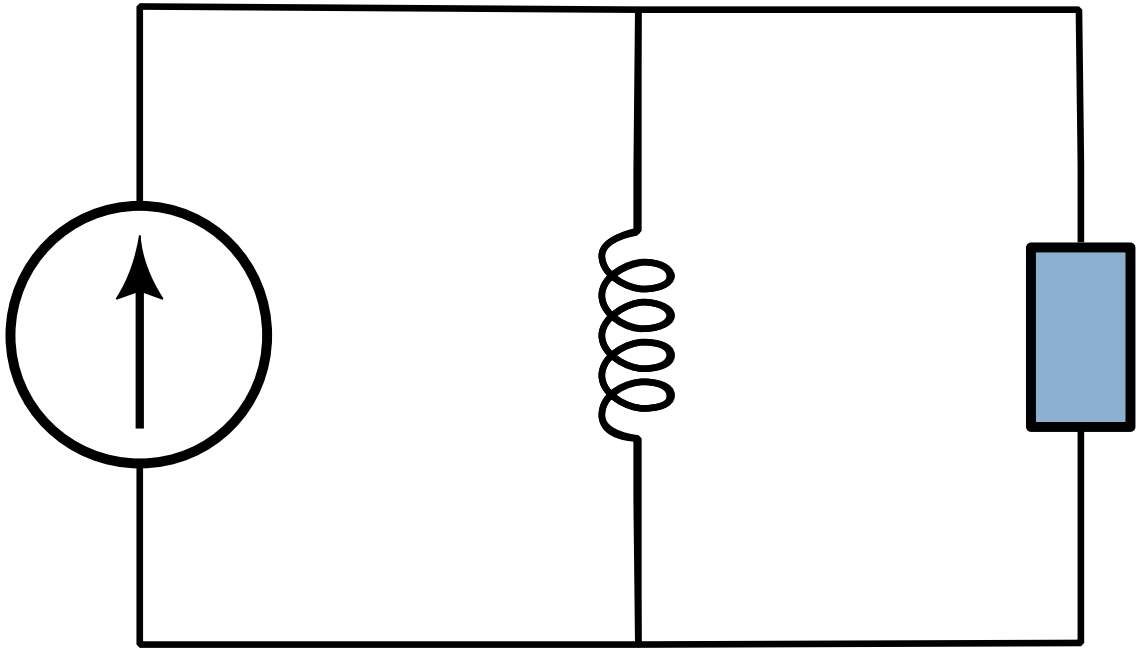
Module 3: Reactive Circuits

- Capacitors
- Inductors
- First-order differential equations
- RC Circuits
- RL Circuits
- Second-order differential equations
- RLC Circuits

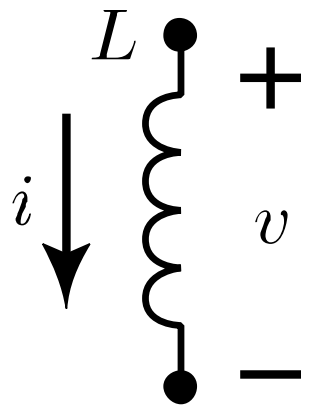
Lesson Objectives

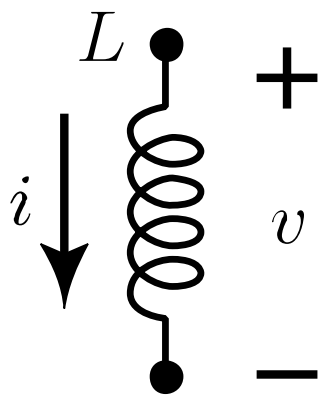
- Describe the construction and behavior of an inductor
- Find current through an inductor
- Find voltage across an inductor
- Explain how a voltage is created across an inductor

Inductors



Current and Voltage

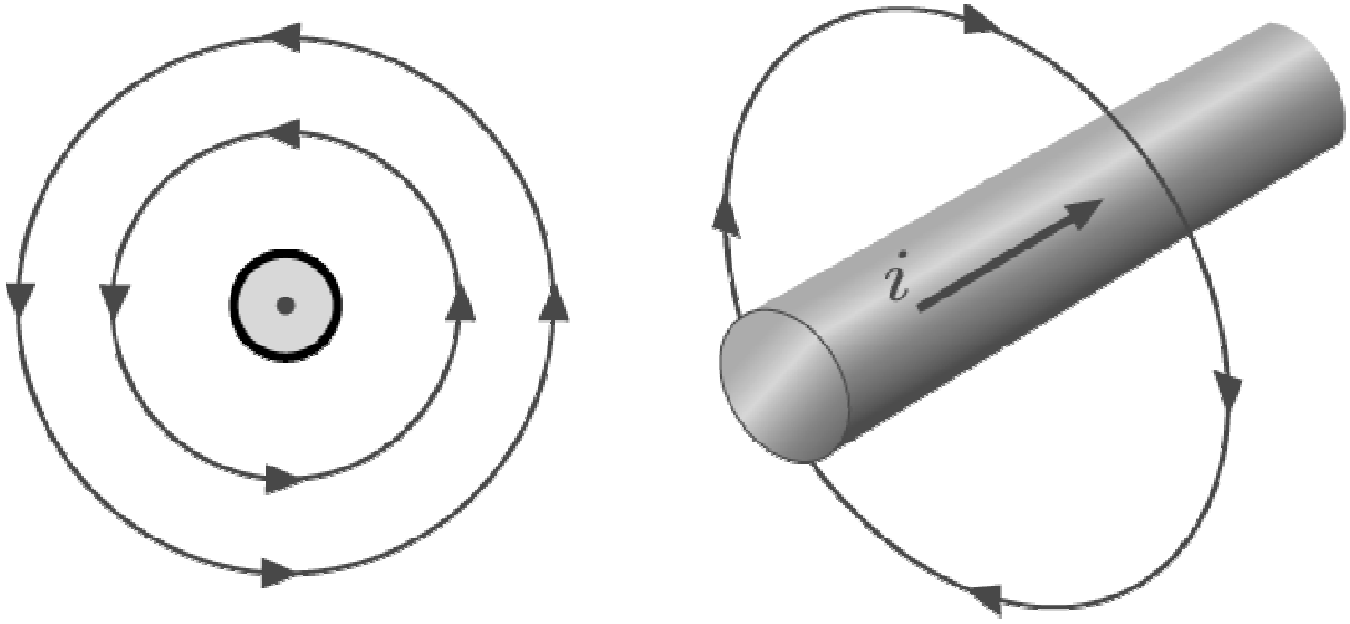




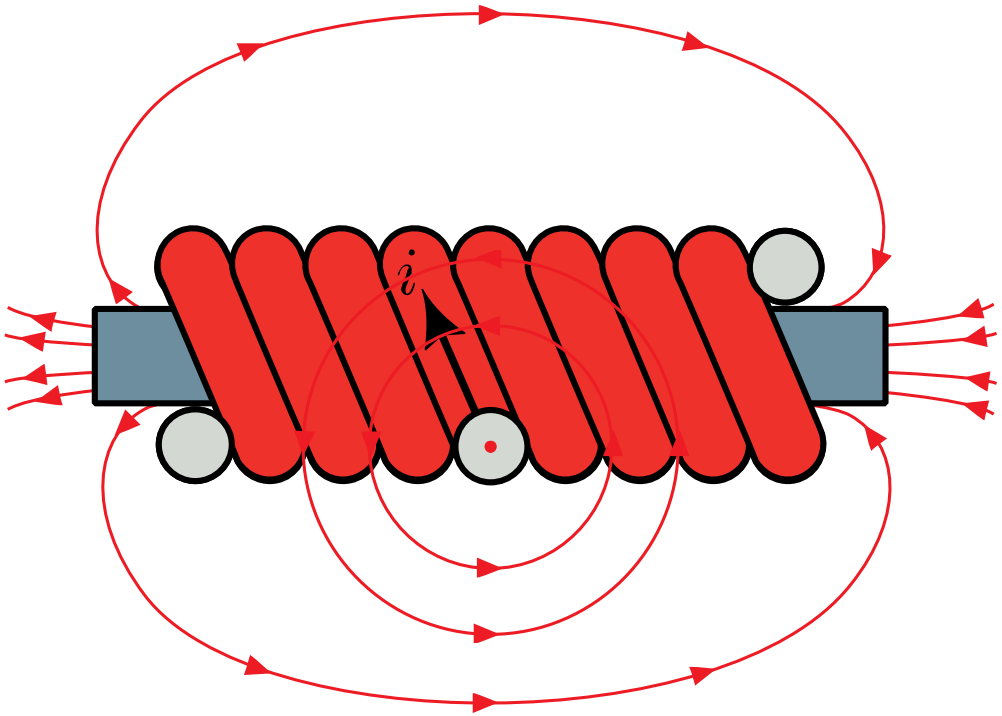
Inductance	
Units	henry (H)
Variable	L

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

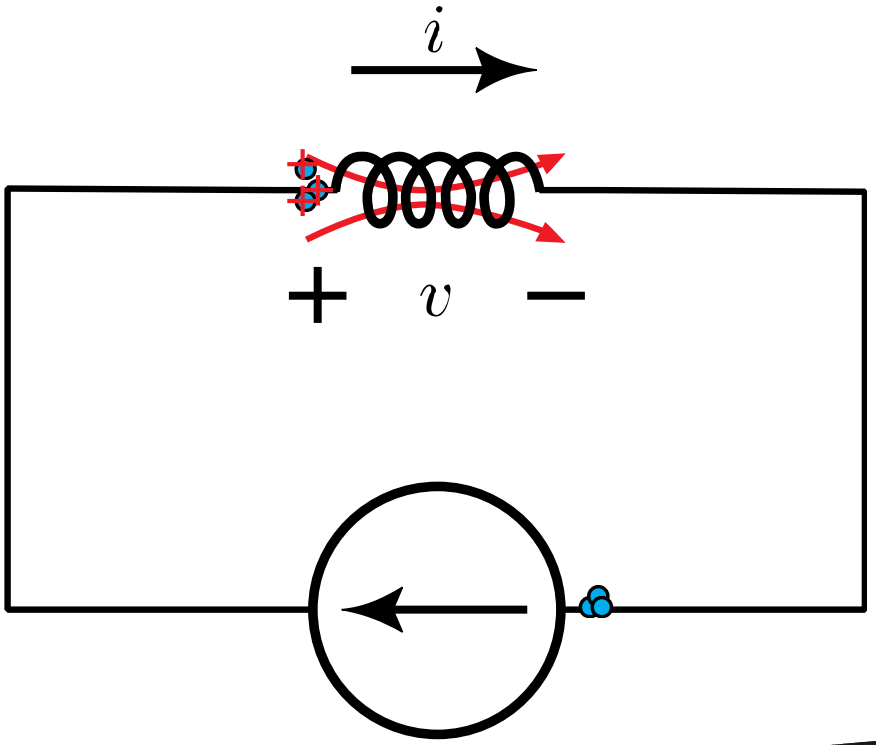
Ampère's Law



How Inductors Work



Voltages Across a Wire



Summary

- Presented the equations for current and voltage in inductors
- Introduced Ampère's Law and showed how inductors work in context of this law
- Showed how a voltage is created across an inductor as currents change in a system

Next Class

- Present inductors as circuit devices
- Behavior of inductors in a system