EECS 16B
Designing Information Devices and Systems II

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Announcements

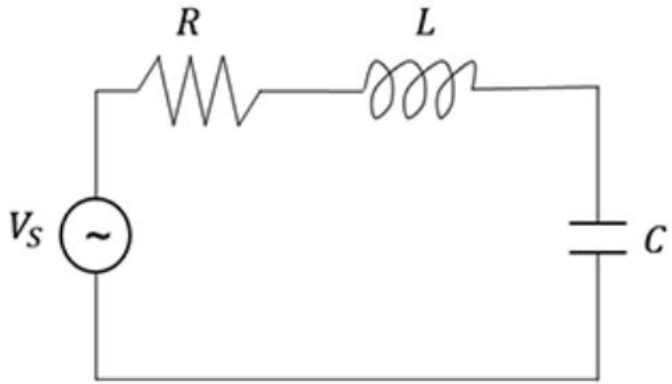
- Midterm #1
  - Monday, February 26, 8-10pm
  - Covers through the end of circuits material (resonant circuits / Q)
- Lab
  - New and Improved Lab #5 this week
  - No need to bring your car! (...this week only)
  - Buffer lab next two weeks
  - Midterm lab report is due 3/6

Today

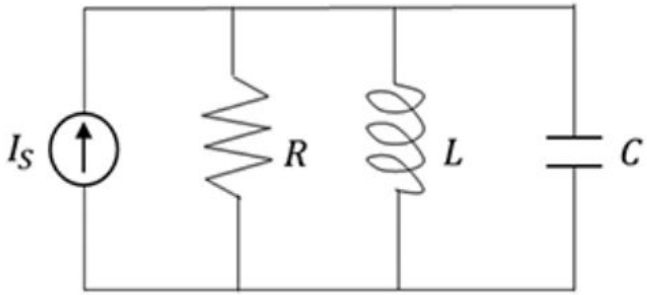
- State space VDEs with no input - solving for x(t)
  - more phase portraits
  - basis and change of basis
  - finding x(t) for a diagonal system (“uncoupled” dynamics)
  - finding x(t) for a generic system (“coupled” dynamics)

Quality Factor (Q)

$$Q \triangleq \frac{E_{\text{stored}}}{E_{\text{lost per cycle}}} = \frac{P_{\text{reactive}}}{P_{\text{avg}}}$$



$$Q = \frac{\omega_0 L}{R} = \frac{1}{\omega_0 C R} = \frac{1}{R}\sqrt{\frac{L}{C}} \qquad \omega_0 = \frac{1}{\sqrt{LC}}$$



$$Q = \frac{R}{\omega_0 L} = \omega_0 C R = R\sqrt{\frac{C}{L}} \qquad \omega_0 = \frac{1}{\sqrt{LC}}$$