
EE40
Lecture 11
Venkat Anantharam

2/15/08

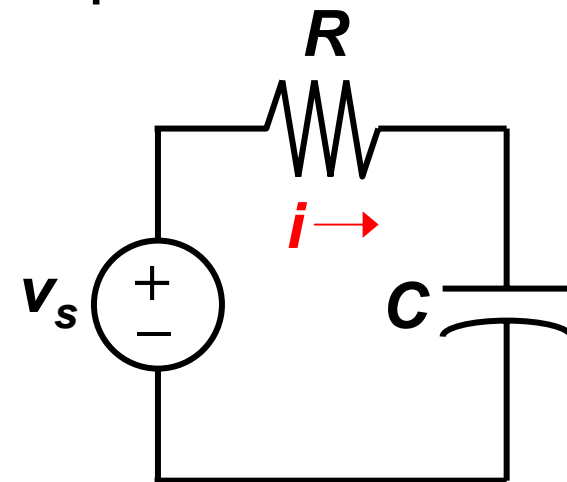
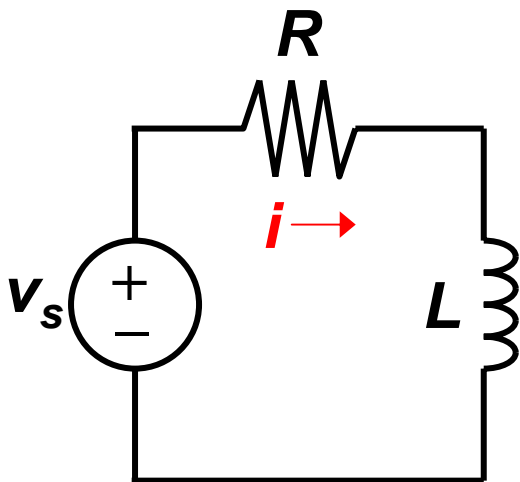
Reading: Chap. 4: first order
circuits

Chapter 4

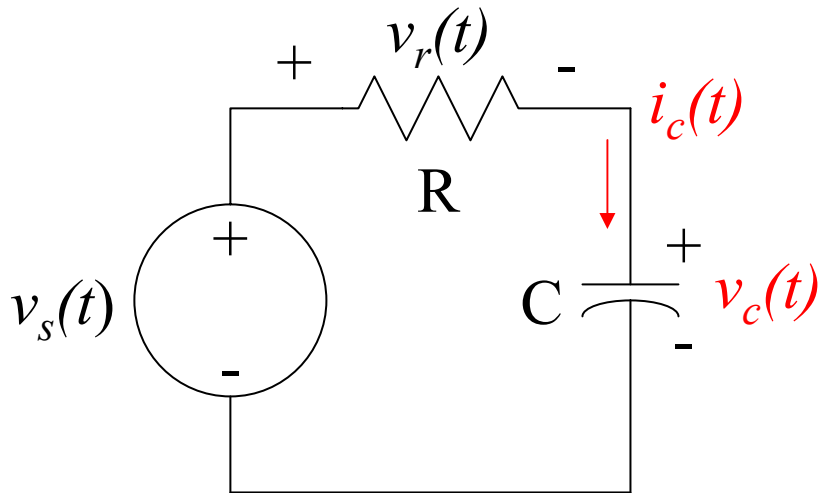
- The material covered in lecture was largely included in the lecture notes for Lecture 10.
- Please read Chapter 4.

First-Order Circuits

- A circuit that contains only (possibly time varying) sources, resistors and an inductor is called an ***RL circuit***.
- A circuit that contains only (possibly time varying) sources, resistors and a capacitor is called an ***RC circuit***.
- RL and RC circuits are called first-order circuits because their voltages and currents are described by first-order differential equations.



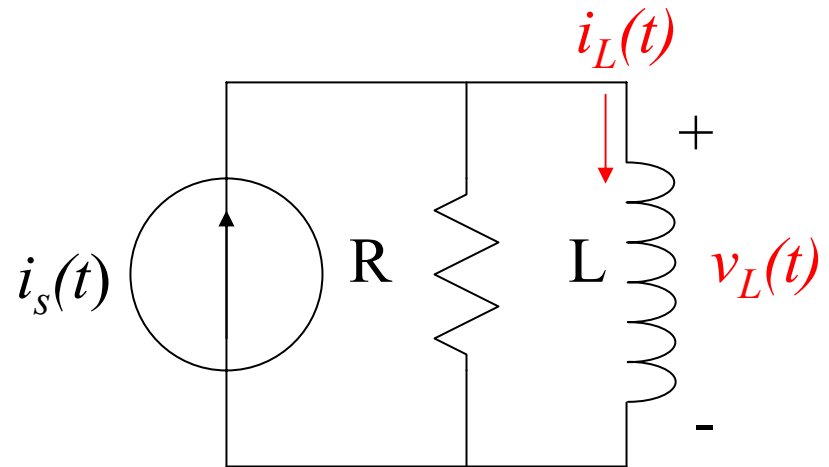
First Order Circuits



KVL around the loop:

$$v_r(t) + v_c(t) = v_s(t)$$

$$RC \frac{dv_c(t)}{dt} + v_c(t) = v_s(t)$$



One KCL equation:

$$\frac{v(t)}{R} + \frac{1}{L} \int_{-\infty}^t v(x) dx = i_s(t)$$

$$\frac{L}{R} \frac{di_L(t)}{dt} + i_L(t) = i_s(t)$$