

Energy Systems I

Homework 7

Due by 5:00pm on Monday, November 10

1. For the following 4 circuits do the following

a Plot $v_o(t)$ versus time

b Comment how the behavior of each circuit relates to the fundamental rules of power electronics discussed in class.

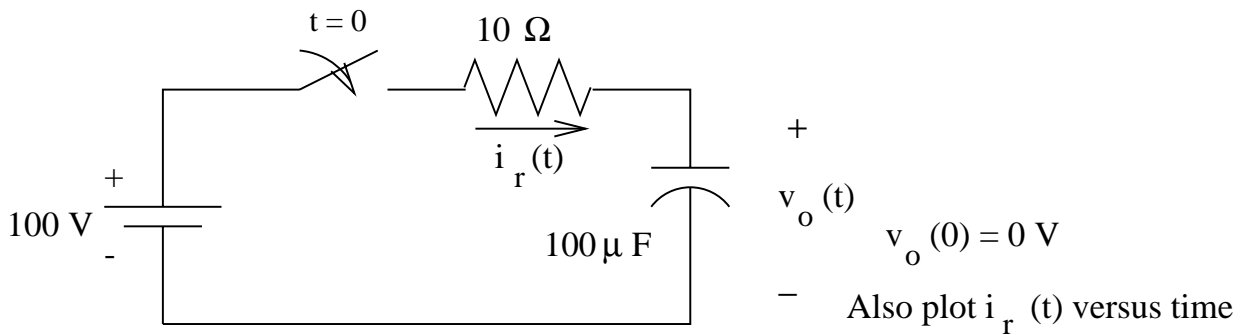


Figure 1:

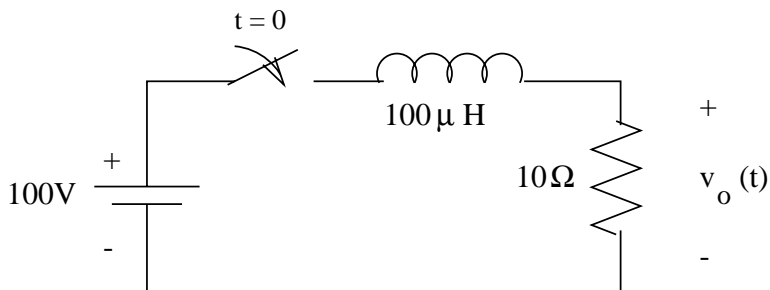


Figure 2:

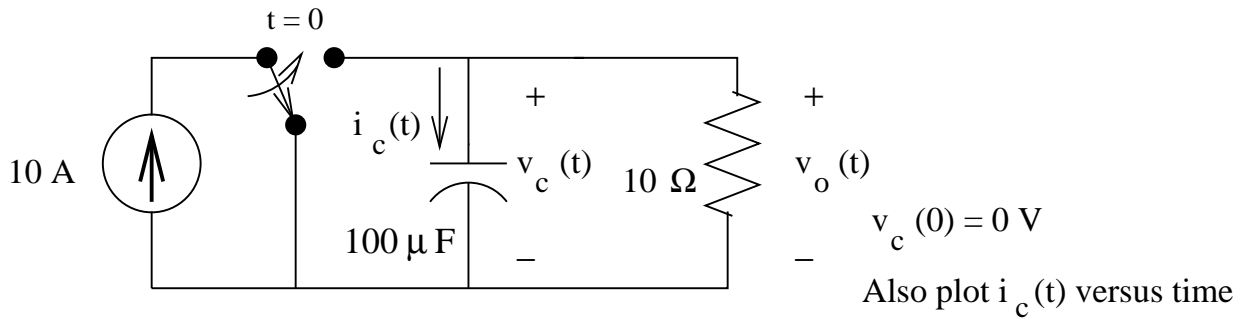


Figure 3:

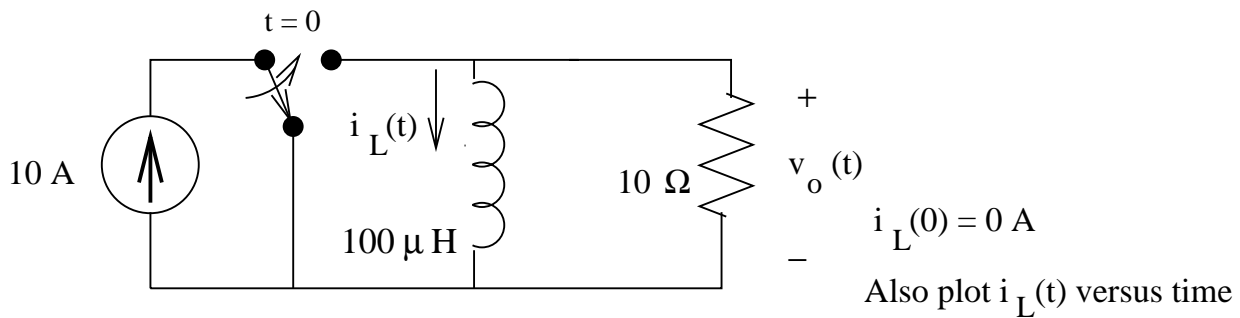


Figure 4:

2. A buck converter has $V_{in} = 48\text{V}$ and a Duty ratio of 0.5. Sketch the ideal steady-state output voltage waveform assuming a switching frequency of 10Hz. What is the average output voltage? Repeat for a Duty ratio of 0.65.

Assume that the converter is loaded by a 10 Ohm resistor, calculate the average load current and the average input current for duty ratios of 0.5 and 0.65.

3. Problem 7-1 in Mohan.