Homework 8 First-Order Transients

HW36:

Consider the time-varying circuit shown in Fig. 1.

(a) Is this circuit excited by initial conditions, sources, or both?
(b) What is the value of capacitance needed in Fig. 1 so that the voltage across the capacitor never exceeds (a) 200 V, (b) 20 V, and (c) 2 V ?

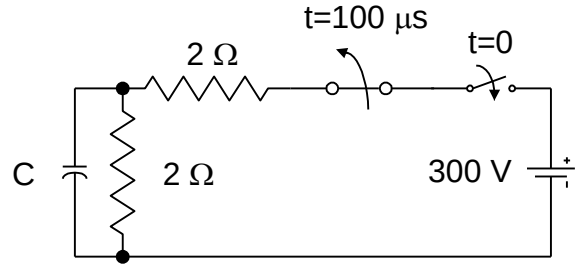


Figure 1

HW37:

2 Consider the time-varying circuit shown in Fig. 2.

(a) Is this circuit excited by initial conditions, sources, or both?
(b) Find the voltage across the capacitor in Fig. 2 for all times t>0.
(c) What role does the ideal diode play in this circuit, if any?

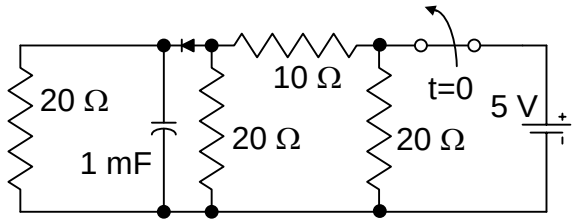


Figure 2

HW38:

Consider the time-varying circuit shown in Fig. 3.

(a) Is this circuit excited by initial conditions, sources, or both?
(b) Find the voltage across the inductor in Fig. 3 for all times t>0.
(c) Find the voltage across the 10 Ω resistor in Fig. 3 for all times t>0.

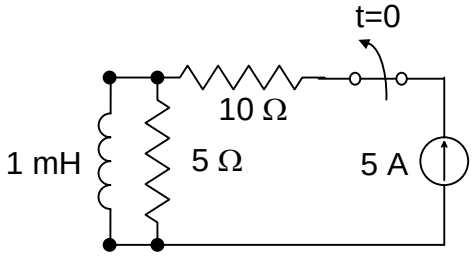
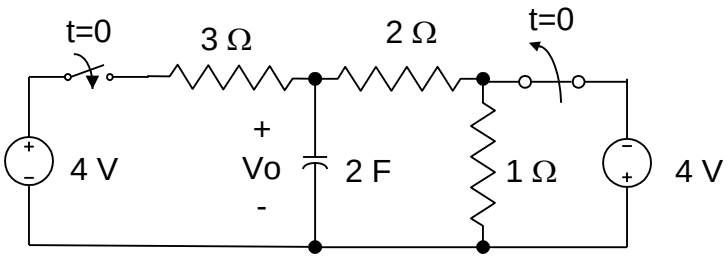


Figure 3

HW39:

Consider the time-varying circuit shown below.

(a) Is this circuit excited by initial conditions, sources, or both?
(b) Find the voltage across the capacitor in Fig. 7 for all times t>0.
(c) Find the time when the capacitor voltage is zero.



HW40:

Find the time, t_{zero}, when the voltage on the capacitor equals zero (MΩ = mega-ohm).