GEORGIA INSTITUTE OF TECHNOLOGY
School of Electrical and Computer Engineering

Course ECE 2040

Circuit Analysis

Assigned: January 19, 2001
Due: January 26, 2001

Problem Set #2

Reading: Read the following sections from the class notes:
Chapter 2, Sections 2.1

Problem 2.1: Find the current $i_1(t)$ for the circuit shown in Figure 1.

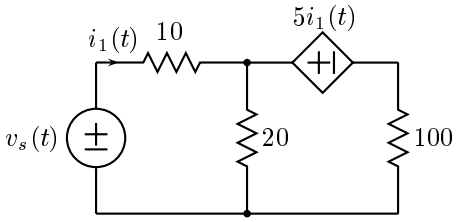

Figure 1: Circuit for Problem 2.1.

Problem 2.2: Determine the voltage $v(t)$ in the circuit in Figure 2.

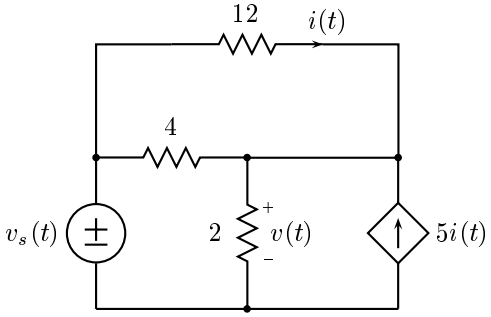

Figure 2: Figure for Problem 2.2.

Problem 2.3: This problem is concerned with the three networks shown in Figure 3.

(a) For the network in (a)

(i.) Draw the basic network.

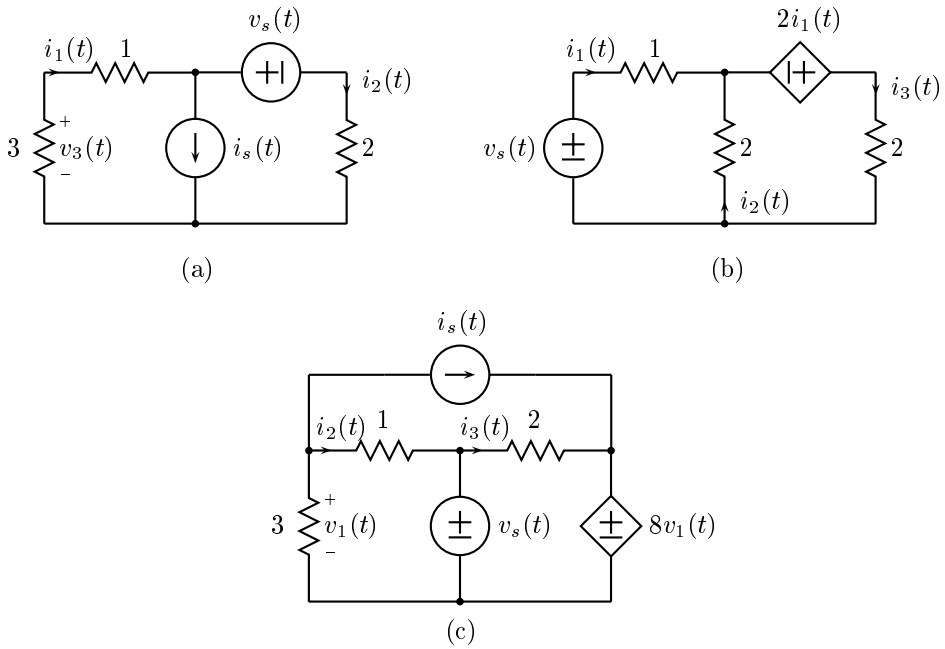

Figure 3: Networks for Problem 2.3.

(ii.) Identify the closed paths in the original network that correspond to meshes in the basic network.

(iii.) Identify the closed surfaces in the original network that correspond to nodes in the basic network.

(b) Repeat for the network in (b).

(c) Repeat for the network in (c).

Problem 2.4: For the circuit in Figure 4

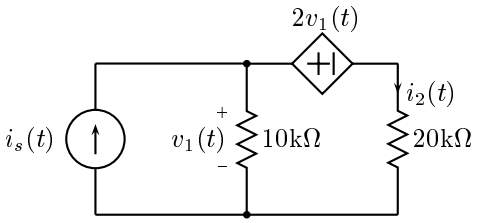

Figure 4: Circuit for Problem 2.4.

(a) Write a minimal set of KCL equations to specify the equilibrium solution, based on the basic network associated with the circuit. These should be expressed in terms of the variables indicated on the figure.

(b) Write a minimal set of KVL equations to specify the equilibrium solution, based on the basic network. These should be expressed in terms of the indicated variables.

(c) Solve for $v_1(t)$ and $i_2(t)$.

Problem 2.5: Set up a set of minimal KCL and KVL equations to find the element voltages in the circuit of Figure 5 using the Simplified Exhaustive Method.

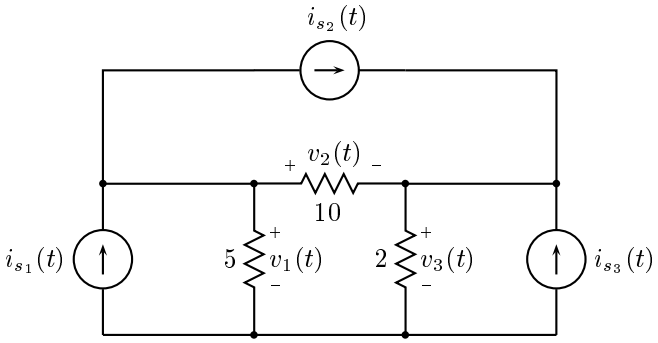

Figure 5: Circuit for Problems 2.5.

Problem 2.6: Set up a set of minimal KCL and KVL equations to find the element currents in the circuit of Figure 6 using the Simplified Exhaustive Method.

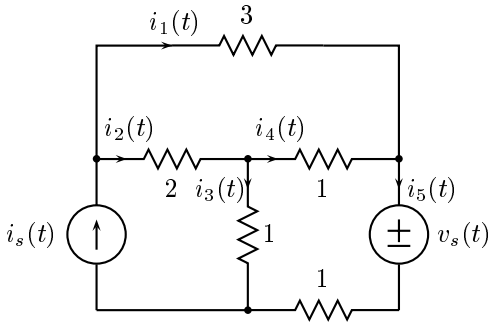

Figure 6: Circuit for Problems 2.6.