

Problems

1.1 An ideal voltage source is described by the function $v(t) = 10e^{-t}$ V. Find the value of this voltage source when (a) $t = 0$ s, (b) $t = 1$ s, (c) $t = 2$ s, (d) $t = 3$ s, (e) $t = 4$ s.

1.2 An ideal voltage source is described by the function $v(t) = 5 \sin(\pi/2)t$ V. Find the value of this voltage source when (a) $t = 0$ s, (b) $t = 1$ s, (c) $t = 2$ s, (d) $t = 3$ s, and (e) $t = 4$ s.

1.3 An ideal voltage source is described by the function $v(t) = 3 \cos(\pi/2)t$ V. Find the value of this voltage source when (a) $t = 0$ s, (b) $t = 1$ s, (c) $t = 2$ s, (d) $t = 3$ s, and (e) $t = 4$ s.

1.4 Find the current in a region when the total charge in the region is described by the function (a) $q(t) = 4e^{-2t}$ C, (b) $q(t) = 3 \sin \pi t$ C, (c) $q(t) = 6 \cos 2\pi t$ C, and (d) $q(t) = 5e^{-4t} \cos 3t$ C.

1.5 An ideal voltage source is described by the function shown in Fig. P1.5. Find the value of this voltage source when (a) $t = 0$ s, (b) $t = 1$ s, (c) $t = 2$ s, (d) $t = 3$ s, and (e) $t = 4$ s.

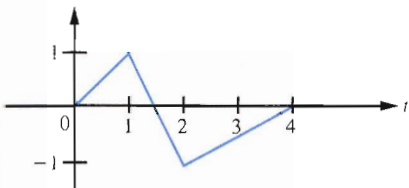


Fig. P1.5

1.6 The total charge $q(t)$ in some region is described by the function shown in Fig. P1.5. Sketch the current $i(t)$ in this region.

1.7 Consider the circuit shown in Fig. P1.7. (a) Given $i_1 = 4$ A, find v_1 . (b) Given $i_2 = -2$ A, find v_2 . (c) Given $i_3 = 2$ A, find v_3 . (d) Given $i_4 = -2$ A, find v_4 .

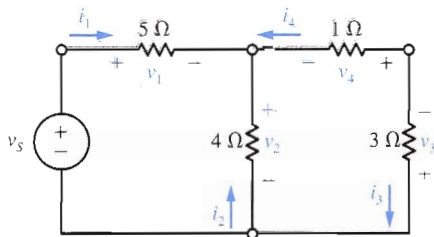


Fig. P1.7

1.8 Consider the circuit in Fig. P1.7. (a) Given $v_1 = 30$ V, find i_1 . (b) Given $v_2 = 12$ V, find i_2 . (c) Given $v_3 = -9$ V, find i_3 . (d) Given $v_4 = -3$ V, find i_4 .

1.9 Consider the circuit shown in Fig. P1.7. (a) Given $v_1 = -10$ V, find i_1 . (b) Given $i_2 = 1$ A, find v_2 . (c) Given $v_3 = 3$ V, find i_3 . (d) Given $i_4 = 1$ A, find v_4 .

1.10 Consider the circuit in Fig. P1.10. (a) Given $v_1 = -6$ V, find i_1 . (b) Given $v_2 = 24$ V, find i_2 . (c) Given $v_3 = 11$ V, find i_3 . (d) Given $v_4 = 21$ V, find i_4 . (e) Given $v_5 = -14$ V, find i_5 .

1.11 Consider the circuit shown in Fig. P1.10. (a) Given $i_1 = 1.5$ A, find v_1 . (b) Given $i_2 = -4$ A, find v_2 . (c) Given $i_3 = 5.5$ A, find v_3 . (d) Given $i_4 = 3.5$ A, find v_4 . (e) Given $i_5 = 3.5$ A, find v_5 .

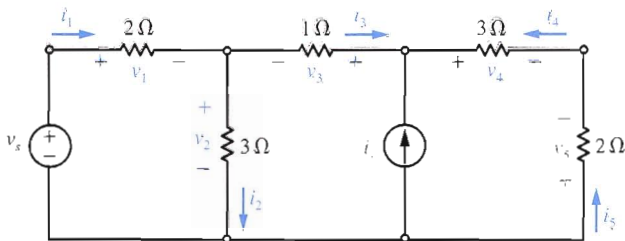


Fig. P1.10