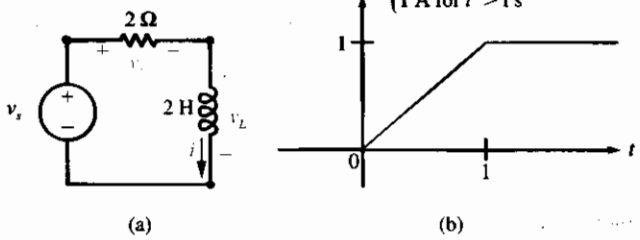
Problems

3.1 For the circuit shown in Fig. P3.1*a*, suppose that $i(t)$ is described by the function given in Fig. P3.1*b*. Sketch (a) $v(t)$, (b) $w_L(t)$, (c) $p_R(t)$, (d) $v_R(t)$, and (e) $v_s(t)$.



(a) (b)

Fig. P3.1

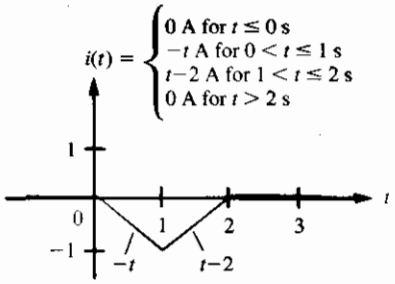


Fig. P3.2

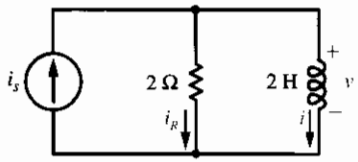


Fig. P3.3

3.2 For the circuit shown in Fig. P3.1*a*, suppose that $i(t)$ is described by the function given in Fig. P3.2. Sketch (a) $v(t)$, (b) $w_L(t)$, (c) $p_R(t)$, (d) $v_R(t)$, and (e) $v_s(t)$.

3.3 For the circuit shown in Fig. P3.3, suppose that $i(t)$ is described by the function given in Fig. P3.1*b*. Sketch (a) $v(t)$, (b) $w_L(t)$, (c) $p_R(t)$, (d) $i_R(t)$, and (e) $i_s(t)$.

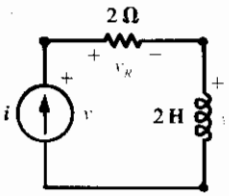
3.4 For the circuit shown in Fig. P3.3, suppose that $i(t)$ is described by the function given in Fig. P3.2. Sketch (a) $v(t)$, (b) $w_L(t)$, (c) $p_R(t)$, (d) $i_R(t)$, and (e) $i_s(t)$.

3.5 For the circuit shown in Fig. P3.5, suppose that $i(t)$ is described by the function given in Fig. P3.1*b*. Sketch (a) $v_R(t)$, (b) $v_L(t)$, and (c) $v(t)$.

3.6 For the circuit shown in Fig. P3.5, suppose that $i(t)$ is described by the function given in Fig. P3.2. Sketch (a) $v_R(t)$, (b) $v_L(t)$, and (c) $v(t)$.

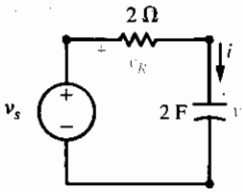
3.7 For the circuit shown in Fig. P3.7*a*, suppose that $v(t)$ is described by the function given in Fig. P3.7*b*. Sketch (a) $i(t)$, (b) $w_C(t)$, (c) $p_R(t)$, (d) $v_R(t)$, and (e) $v_s(t)$.

3.8 For the circuit shown in Fig. P3.8, suppose that $v(t)$ is described by the function given in Fig. P3.7*b*.

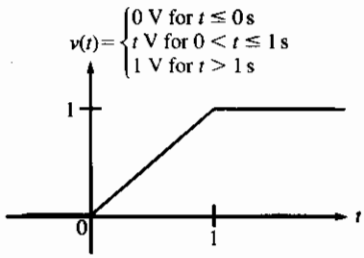


(a)

Fig. P3.5



(a)



(b)

Fig. P3.7

Sketch (a) $i(t)$, (b) $w_C(t)$, (c) $p_R(t)$, (d) $i_R(t)$, and (e) $i_s(t)$.

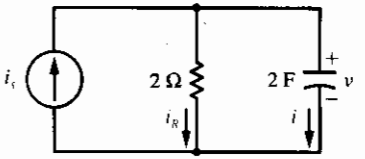


Fig. P3.8

3.9 For the op-amp circuit shown in Fig. P3.9, suppose that $v(t)$ is described by the function given in Fig. P3.7*b*. Sketch (a) $i(t)$, (b) $i_R(t)$, (c) $v_R(t)$, (d) $v_s(t)$, and (e) $v_o(t)$.

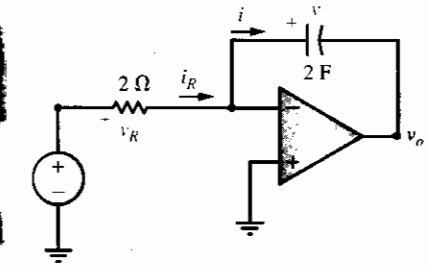


Fig. P3.9

3.10 For the op-amp circuit shown in Fig. P3.9, connect an additional 2-Ω resistor in parallel with the capacitor. Suppose that $v(t)$ is described by the function given in Fig. P3.7*b*. Sketch (a) $i(t)$, (b) $i_R(t)$, (c) $v_R(t)$, (d) $v_s(t)$, and (e) $v_o(t)$.

3.11 For the op-amp circuit shown in Fig. P3.11, suppose that $v(t)$ is described by the function given in Fig. P3.7*b*. Sketch (a) $i(t)$, (b) $i_R(t)$, (c) $v_R(t)$, (d) $v_s(t)$, and (e) $v_o(t)$.

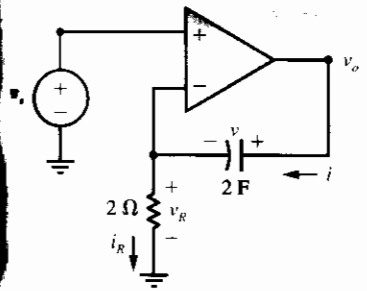


Fig. P3.11

3.12 For the op-amp circuit given in Fig. P3.11, connect an additional 2-Ω resistor in parallel with the capacitor. Suppose that $v(t)$ is described by the function given in Fig. P3.7*b*. Sketch (a) $i(t)$, (b) $i_R(t)$, (c) $v_R(t)$, (d) $v_s(t)$, and (e) $v_o(t)$.

3.13 For the op-amp circuit shown in Fig. P3.13, suppose that $v(t)$ is described by the function given in Fig. P3.7*b*. Sketch (a) $i(t)$, (b) $i_R(t)$, (c) $v_R(t)$, (d) $v_s(t)$, and (e) $v_o(t)$.

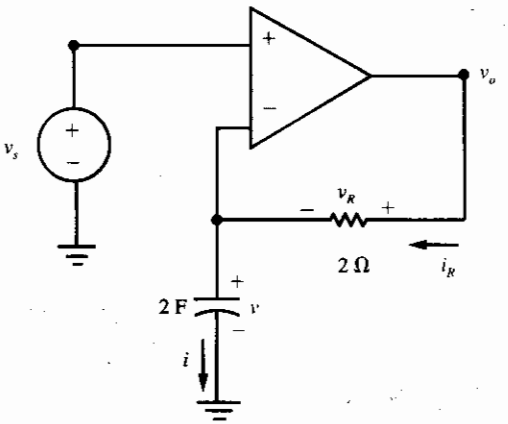


Fig. P3.13

3.14 For the op-amp circuit shown in Fig. P3.13, connect an additional 2-Ω resistor in parallel with the capacitor. Suppose that $v(t)$ is described by the function given in Fig. P3.7*b*. Sketch (a) $i(t)$, (b) $i_R(t)$, (c) $v_R(t)$, (d) $v_s(t)$, and (e) $v_o(t)$.

3.15 Show the following: (See p. 178.)

(a) Inductors connected in series can be combined as depicted in Fig. P3.15*a*.

(b) Inductors connected in parallel can be combined as depicted in Fig. P3.15*b*.

(c) Capacitors connected in parallel can be combined as depicted in Fig. P3.15*c*.

(d) Capacitors connected in series can be combined as depicted in Fig. P3.15*d*.

3.16 For the circuit shown in Fig. P3.1*a*, suppose that $v(t)$ is described by the function given in Fig. P3.16. Sketch (a) $i(t)$, (b) $v_R(t)$, and (c) $v_s(t)$. (See p. 178.)