3.63 For the series RLC circuit shown in Fig. P3.63, suppose that \( R = 2 \, \Omega \), \( L = 1 \, \text{H} \), \( C = 0.25 \, \text{F} \), \( v_i(t) = 12 \, \text{V} \) for \( t < 0 \) s and \( v_i(t) = 0 \, \text{V} \) for \( t \geq 0 \) s. Find \( v(t) \) and \( i(t) \) for all time.

![Fig. P3.63](image)

3.64 For the series RLC circuit shown in Fig. P3.64, suppose that \( R = 2 \, \Omega \), \( L = 0.25 \, \text{H} \), \( C = 0.2 \, \text{F} \), \( v_i(t) = 10 \, \text{V} \) for \( t < 0 \) s and \( v_i(t) = 0 \, \text{V} \) for \( t \geq 0 \) s. Find \( v(t) \) and \( i(t) \) for all time.

![Fig. P3.64](image)

3.65 For the series RLC circuit shown in Fig. P3.65, suppose that \( R = 2 \, \Omega \), \( L = 1 \, \text{H} \), \( C = 1 \, \text{F} \), \( v_i(t) = 6 \, \text{V} \) for \( t < 0 \) s and \( v_i(t) = 0 \, \text{V} \) for \( t \geq 0 \) s. Find \( v(t) \) and \( i(t) \) for all time.

![Fig. P3.65](image)

3.66 For the circuit shown in Fig. P3.66, suppose that \( v_i(t) = 6 \, \text{V} \) for \( t < 0 \) s and \( v_i(t) = 0 \, \text{V} \) for \( t \geq 0 \) s. Find \( v(t) \) and \( i(t) \) for all time.

![Fig. P3.66](image)

3.67 For the circuit shown in Fig. P3.67, suppose that \( v_i(t) = 6 \, \text{V} \) for \( t < 0 \) s and \( v_i(t) = 0 \, \text{V} \) for \( t \geq 0 \) s. Find \( v(t) \) and \( i(t) \) for all time.

![Fig. P3.67](image)

3.68 For the circuit shown in Fig. P3.67, interchange the inductor and the capacitor. Suppose that \( v_i(t) = 6 \, \text{V} \) for \( t < 0 \) s and \( v_i(t) = 0 \, \text{V} \) for \( t \geq 0 \) s. Find the capacitor voltage \( v(t) \) and the inductor current \( i(t) \) for all time.

![Fig. P3.68](image)

3.69 For the parallel RLC circuit shown in Fig. P3.69, suppose that \( R = 0.5 \, \Omega \), \( L = 0.2 \, \text{H} \), \( C = 0.25 \, \text{F} \), and \( i_i(t) = 2 \, \text{mA} \). Find the step responses \( i(t) \) and \( v(t) \).

![Fig. P3.69](image)

3.70 For the parallel RLC circuit shown in Fig. P3.69, suppose that \( R = 3 \, \Omega \), \( L = 3 \, \text{H} \), \( C = \frac{1}{4} \, \text{F} \), and \( i_i(t) = 4 \, \text{mA} \). Find the step responses \( i(t) \) and \( v(t) \).

![Fig. P3.70](image)

3.71 For the series RLC circuit shown in Fig. P3.71, suppose that \( R = 7 \, \Omega \), \( L = 1 \, \text{H} \), \( C = 0.1 \, \text{F} \), and \( v_i(t) = 12 \, \text{V} \). Find the step responses \( v(t) \) and \( i(t) \).

![Fig. P3.71](image)

3.72 For the series RLC circuit shown in Fig. P3.72, suppose that \( R = 2 \, \Omega \), \( L = 1 \, \text{H} \), \( C = 1 \, \text{F} \), and \( v_i(t) = 1 \, \text{V} \). Find the step responses \( v(t) \) and \( i(t) \).

![Fig. P3.72](image)
and $v(0) = 12u(t)$ V. Find the step responses $v(t)$ and $i(t)$.

3.77 For the RLC circuit shown in Fig. 3.43 on p. 11, suppose that $R = \frac{1}{2}$ Ω, $L = \frac{1}{2}$ H, $C = \frac{1}{2}$ F, and $i = 1$ V. Find the unit step responses $i(t)$ and $v(t)$.

3.74 For the RLC circuit shown in Fig. 3.43 on p. 11, suppose that $R = \frac{1}{2}$ Ω, $L = \frac{1}{2}$ H, $C = \frac{1}{2}$ F, and $i = 1$ V. Find the unit step responses $i(t)$ and $v(t)$.

3.5 For the circuit shown in Fig. P3.66, suppose $v(t) = 9u(t)$ V. Find the step response $v(t)$.

3.76 For the circuit shown in Fig. P3.67, suppose $v(t) = 6u(t)$ V. Find the step responses $i(t)$ and $v(t)$.

3.7 Find the step response $v(t)$ for the op-amp circuit shown in Fig. P3.77 when $C = \frac{1}{2}$ F and $v(t) = 4u(t)$ V.

3.78 Find the step response $v(t)$ for the op-amp circuit shown in Fig. P3.77 when $C = \frac{1}{2}$ F and $v(t) = 8u(t)$ V.

3.79 Find the step response $v(t)$ for the op-amp circuit shown in Fig. P3.77 when $C = \frac{1}{2}$ F and $v(t) = 6u(t)$ V.

3.30 Find the step response $v(t)$ for the op-amp circuit shown in Fig. P3.80 when $C = \frac{1}{2}$ F and $v(t) = 4u(t)$ V.

3.81 Find the step response $v(t)$ for the op-amp circuit shown in Fig. P3.80 when $C = 1$ F and $v(t) = 4u(t)$ V.

3.32 Find the step response $v(t)$ for the op-amp circuit shown in Fig. P3.80 when $C = \frac{1}{2}$ F and $v(t) = 2u(t)$ V.