

**8.69** 14.26- $\Omega$  resistor in parallel with a 176- $\mu\text{F}$  capacitor

**8.71** 2.5  $\mu\text{M}$ , 625  $\mu\text{F}$

$$\mathbf{8.73} \quad \frac{d^2v}{dt^2} + \frac{R}{L} \frac{dv}{dt} + \frac{R}{LC} i_D + \frac{1}{C} \frac{di_D}{dt} = \frac{v_s}{LC}$$

## Chapter 9

**9.1** (a)  $10^3$  rad/s, (b) 159.2 Hz, (c) 6.283 ms, (d)  $12 \cos(10^3t - 66^\circ)$  V, (e) 2.65 V

**9.3** (a)  $4 \cos(\omega t - 120^\circ)$ , (b)  $2 \cos(6t + 90^\circ)$ , (c)  $10 \cos(\omega t + 110^\circ)$

**9.5**  $20^\circ$ ,  $v_1$  lags  $v_2$

**9.7** Proof

**9.9** (a)  $1.809 + j0.4944$ , (b)  $4.201 - j1.392$ , (c)  $-0.5042 - j2.243$

**9.11** (a)  $118.3 \angle -39.45^\circ$ , (b)  $10.45 \angle -10.4^\circ$ , (c)  $1.849 \angle -39.45^\circ$

**9.13** (a)  $10 \angle -105^\circ$ , (b)  $5 \angle -100^\circ$ , (c)  $5 \angle -36.87^\circ$

**9.15** (a)  $60 \cos(t + 15^\circ)$ , (b)  $10 \cos(40t + 53.13^\circ)$ , (c)  $2.8 \cos(377t - \pi/3)$ , (d)  $1.3 \cos(10^3t + 247.4^\circ)$

**9.17** (a)  $40 \cos(\omega t - 60^\circ)$ , (b)  $38.36 \sin(\omega t + 96.8^\circ)$ , (c)  $6 \cos(\omega t + 80^\circ)$ , (d)  $11.5 \cos(\omega t - 52.06^\circ)$

**9.19** (a)  $0.8 \cos(2t - 98.13^\circ)$ , (b)  $0.745 \cos(2t - 4.56^\circ)$

**9.21**  $0.289 \cos(377t - 92.45^\circ)$  V

**9.23**  $2 \sin(10^6t - 65^\circ)$

**9.25** 6.5- $\Omega$  resistor

**9.27** 69.82 V

**9.29**  $-5 \sin 2t$  V

**9.31** (a)  $4.472 \cos(3t - 18.43^\circ)$  A,  $17.89 \cos(3t - 18.43^\circ)$  V, (b)  $10 \cos(4t + 36.87^\circ)$  A,  $41.6 \cos(4t + 33.69^\circ)$  V

**9.33** (a)  $1.872 \cos(t - 22.05^\circ)$  A, (b)  $0.89 \cos(5t - 69.14^\circ)$  A, (c)  $0.4417 \cos(10t - 83.66^\circ)$  A

**9.35**  $17.14 \cos 200t$  V

**9.37**  $0.96 \cos(200t - 7.956^\circ)$  A

**9.39**  $2.325 \cos(10t + 94.46^\circ)$  A

**9.41**  $25 \cos(2t - 53.13^\circ)$  A

**9.43**  $8.485 \angle 135^\circ$  A

**9.45** (a)  $0.75 + j0.25 \Omega$ , (b)  $20 + j30 \Omega$

**9.47**  $1 + j0.5 \Omega$

**9.49**  $17.35 \angle 0.9^\circ$  A,  $6.83 + j1.094 \Omega$

**9.51** (a)  $0.0148 \angle -20.22^\circ$  S, (b)  $0.0197 \angle 74.57^\circ$  S

**9.53**  $1.661 + j0.6647$  S

**9.55**  $1.058 - j2.235 \Omega$

**9.57**  $0.3796 + j1.46 \Omega$

9.59 Can be achieved by the RL circuit shown in Fig. E.19.

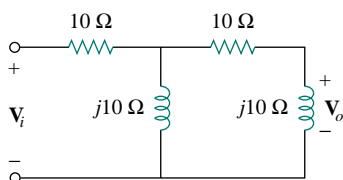


Figure E.19 For Prob. 9.59.

9.61 (a)  $140.2^\circ$ , (b) leading, (c)  $18.43$  V

9.63  $1.8$  k $\Omega$ ,  $0.1$   $\mu$ F

9.65  $104.2$  mH

9.67 Proof

9.69  $38.21 \angle -8.975^\circ \Omega$

9.71  $2$  mH

9.73  $235$  pF

## Chapter 10

10.1  $15.73 \cos(t + 247.9^\circ)$  V

10.3  $3.835 \cos(4t - 35.02^\circ)$  V

10.5  $6.154 \cos(10^3 t + 70.26^\circ)$  V

10.7  $35.74 \sin(1000t - 116.6^\circ)$  A

10.9  $7.906 \angle 43.49^\circ$  A

10.11  $10.58 \angle -112.4^\circ$  A

10.13  $16.64 \angle 56.31^\circ$  V

10.15 (a)  $1, 0, -\frac{j}{R} \sqrt{\frac{L}{C}}$ , (b)  $0, 1, \frac{j}{R} \sqrt{\frac{L}{C}}$

10.17 
$$\frac{\mathbf{V}_s(R + j\omega L + 1/j\omega C_2)}{(1/j\omega C_1 + 1/j\omega C_2)(R + j\omega L + 1/j\omega C_1) + 1/\omega^2 C_1 C_2},$$

$$\frac{\mathbf{V}_s/j\omega C_2}{(1/j\omega C_1 + 1/j\omega C_2)(R + j\omega L + 1/j\omega C_1) + 1/\omega^2 C_1 C_2}$$

10.19  $6.154 \cos(10^3 t + 70.25^\circ)$  V

10.21  $4.67 \angle -20.17^\circ$  A,  $1.79 \angle 37.35^\circ$  A

10.23  $2.179 \angle 61.44^\circ$  A

10.25  $7.906 \angle 43.49^\circ$  A

10.27  $1.971 \angle -2.1^\circ$  A

10.29  $3.35 \angle 174.3^\circ$  A

10.31  $9.902 \cos(2t - 129.17^\circ)$  A

10.33  $10 + 21.45 \sin(2t + 26.56^\circ) + 10.73 \cos(3t - 26.56^\circ)$  V