C10 problems

Practice Problem 10.2

Calculate $\mathbf{V}_1$ and $\mathbf{V}_2$ in the circuit shown in Fig. 10.6.

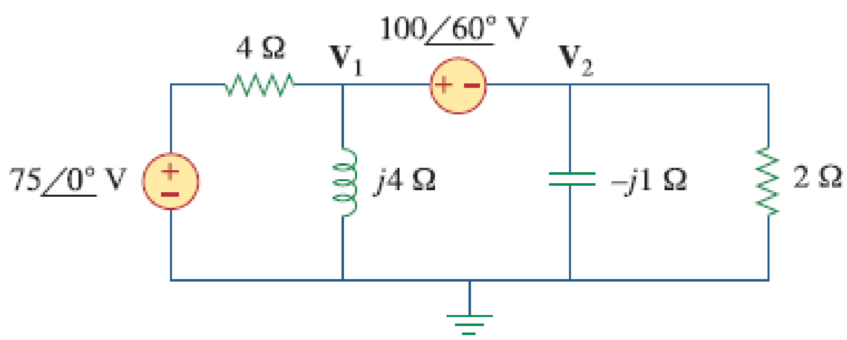

Figure 10.6
For Practice Prob. 10.2.

Answer: $\mathbf{V}_1 = 96.8\angle 69.66^\circ$ V, $\mathbf{V}_2 = 16.88\angle 165.72^\circ$ V.

Practice Problem 10.4

Calculate current $\mathbf{I}_o$ in the circuit of Fig. 10.11.

Answer: $6.089\angle 5.94^\circ$ A.

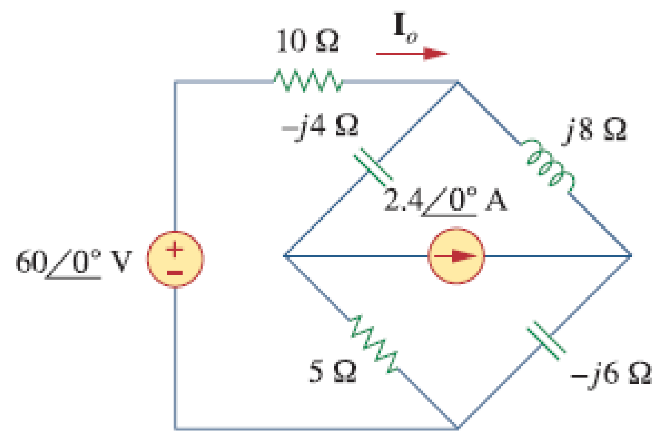

Figure 10.11
For Practice Prob. 10.4.

Practice Problem 10.6

Calculate v_o in the circuit of Fig. 10.15 using the superposition theorem.

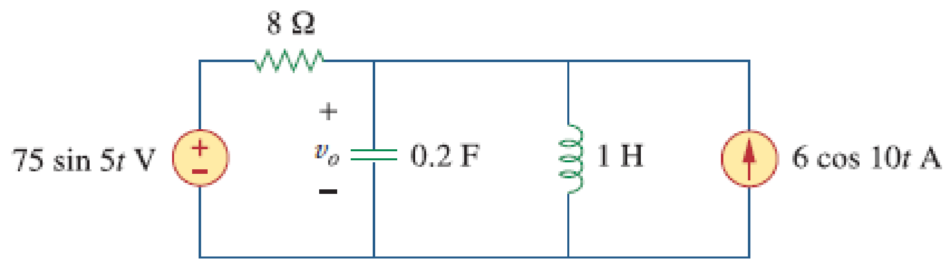

Figure 10.15
For Practice Prob. 10.6.

Answer: $11.577 \sin(5t - 81.12^\circ) + 3.154 \cos(10t - 86.24^\circ)$ V.

Practice Problem 10.12

Obtain the closed-loop gain and phase shift for the circuit in Fig. 10.34. Let $R = 10\ \text{k}\Omega$, $C = 1\ \mu\text{F}$, and $\omega = 1000$ rad/s.

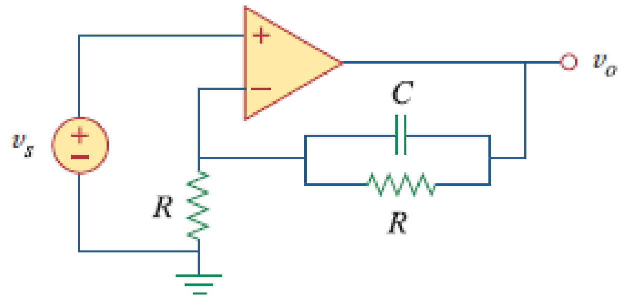

Figure 10.34
For Practice Prob. 10.12.

Answer: 1.0147, $-5.6°$.

Practice Problem 10.15

Determine the equivalent capacitance of the op amp circuit in Fig. 10.41 if $R_1 = 10\ \text{k}\Omega$, $R_2 = 10\ \text{M}\Omega$, and $C = 10\ \text{nF}$.

Answer: $10\ \mu\text{F}$.

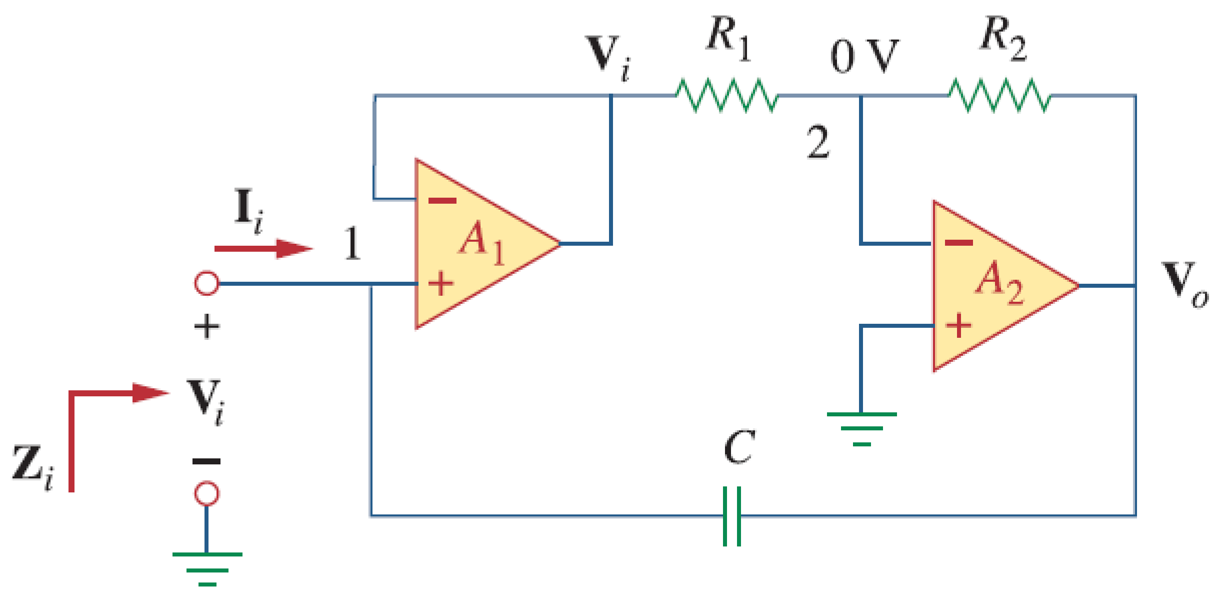

Figure 10.41
Capacitance multiplier.

Practice Problem 10.16

In the Wien-bridge oscillator circuit in Fig. 10.42, let $R_1 = R_2 = 2.5\ \mathrm{k}\Omega$, $C_1 = C_2 = 1$ nF. Determine the frequency f_o of the oscillator.

Answer: 63.66 kHz.

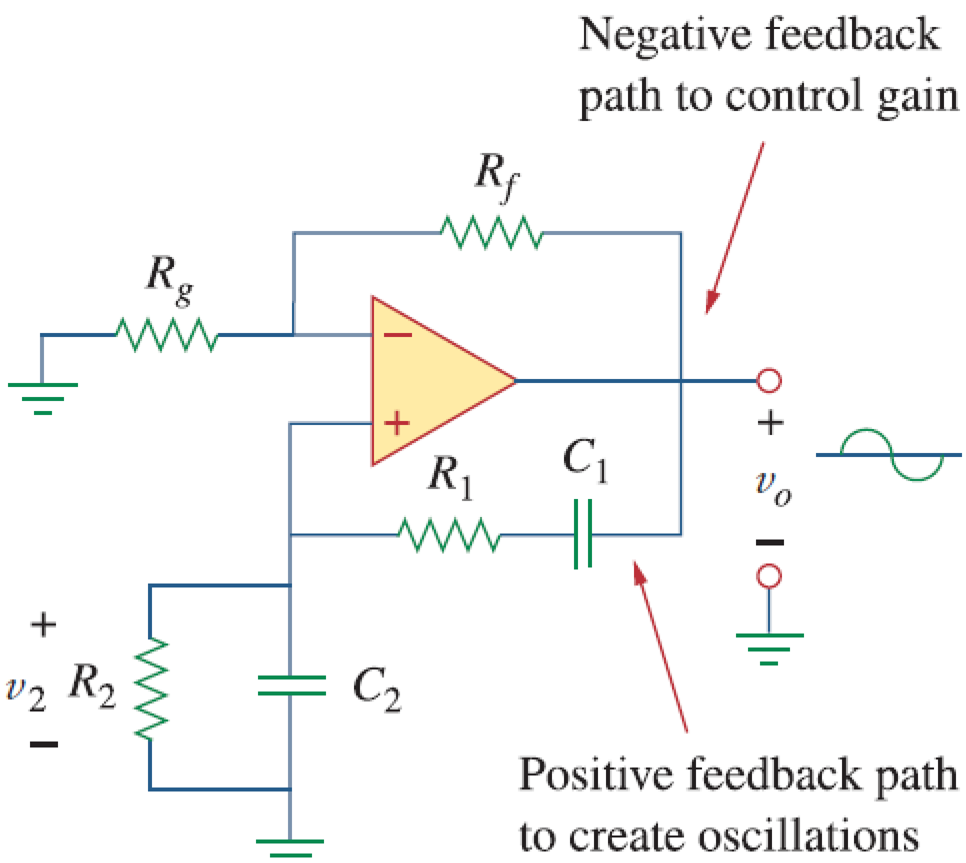

Figure 10.42
Wien-bridge oscillator.

- 10.2 (s10.2)
- 10.4 (s10.3)
- 10.6 (s10.4)
- 10.12 (s10.7)
- 10.15 (s10.9)
- 10.16 (s10.9)