C14 problems

Practice Problem 14.2

Find the transfer function $\mathbf{V}_o(\omega)/\mathbf{I}_i(\omega)$ for the circuit in Fig. 14.7. Obtain its zeros and poles.

Answer: $\dfrac{10(s+2)(s+3)}{s^2+8s+10}$, $s = j\omega$; zeros: $-2, -3$; poles: -1.5505, -6.449.

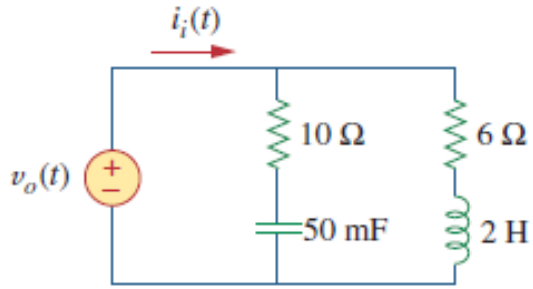

Figure 14.7
For Practice Prob. 14.2.

Practice Problem 14.6

Obtain the transfer function $\mathbf{H}(\omega)$ corresponding to the Bode plot in Fig. 14.20.

Answer: $\mathbf{H}(\omega) = \dfrac{2{,}000{,}000(s + 5)}{(s + 10)(s + 100)^2}$.

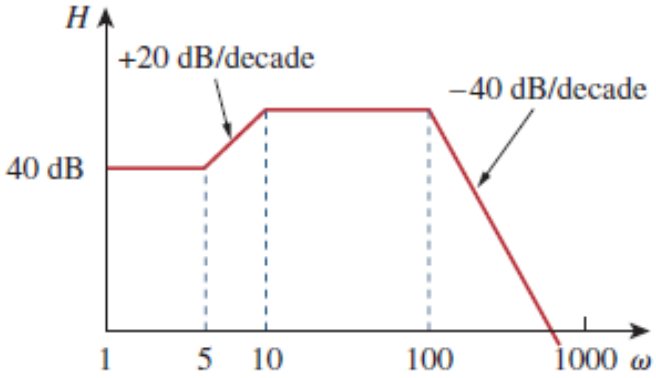

Figure 14.20
For Practice Prob. 14.6.

Practice Problem 14.11

Design a bandpass filter of the form in Fig. 14.35 with a lower cutoff frequency of 20.1 kHz and an upper cutoff frequency of 20.3 kHz. Take $R = 20\ \text{k}\Omega$. Calculate L, C, and Q.

Answer: 15.915 H, 3.9 pF, 101.

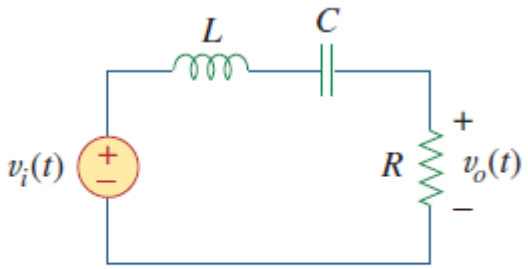

Figure 14.35
A bandpass filter.

Practice Problem 14.13

Design a notch filter based on Fig. 14.47 for $\omega_0 = 20$ krad/s, $K = 5$, and $Q = 10$. Use $R = R_i = 10\,\text{k}\Omega$.

Answer: $C_1 = 4.762$ nF, $C_2 = 5.263$ nF, and $R_f = 50\,\text{k}\Omega$.

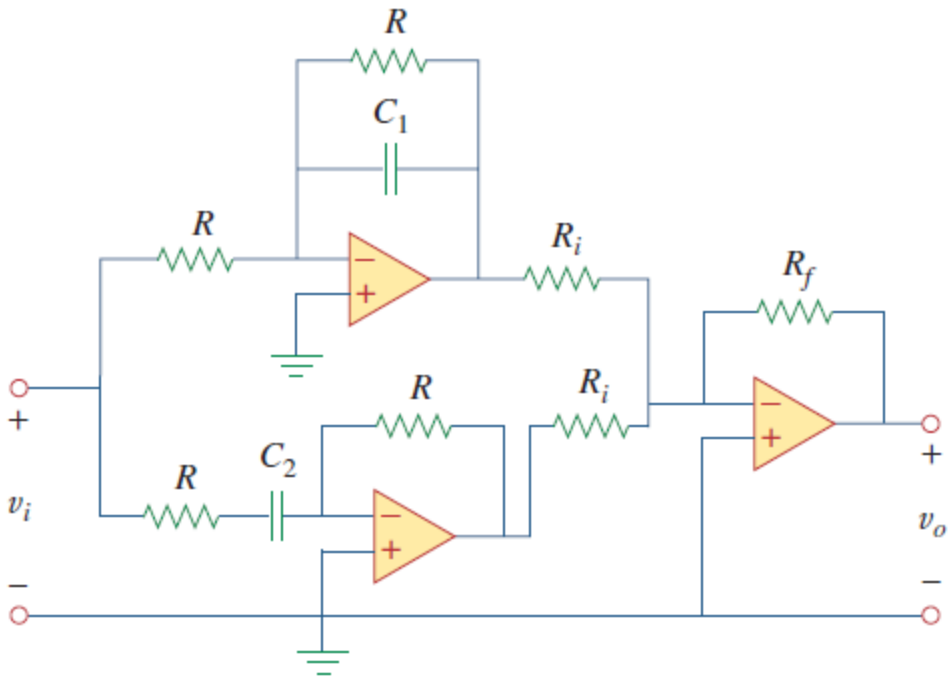

Figure 14.47
Active bandreject filter.

- 14.2 (s14.1)
- 14.6 (s14.4)
- 14.11 (s14.7)
- 14.13 (s14.8)