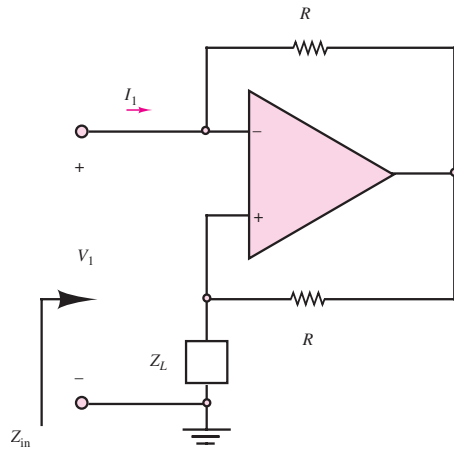**Figure P8.10**

Figure P8.11

8.12 The circuit of Figure P8.12 demonstrates that op-amp feedback can be used to create a resonant circuit without the use of an inductor. Determine the gain function $\frac{V_2}{V_1}$. [*Hint*: Use node analysis.]
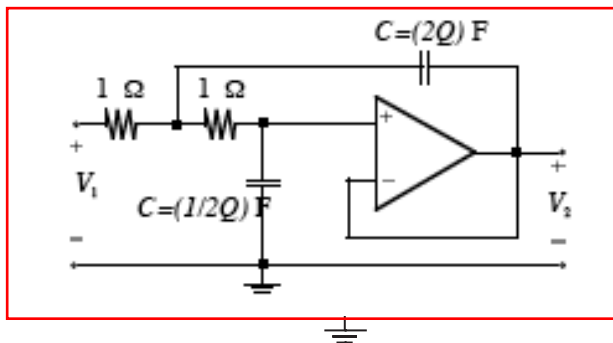

Figure P8.12

8.13 Inductors are difficult to use as components of integrated circuits due to the need for large coils of wire. As an alternative, a "solid-state inductor" can be constructed as in the circuit of Figure 8.13.

a. Determine the impedance looking in $Z_{in} = \frac{V_1}{I_1}$.

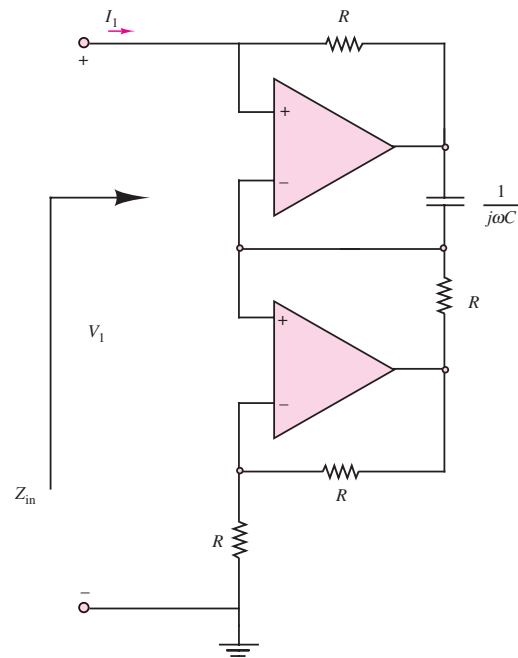b. What is the impedance when $R = 1,000\ \Omega$ and $C = 0.02\ \mu$F?

Figure P8.13

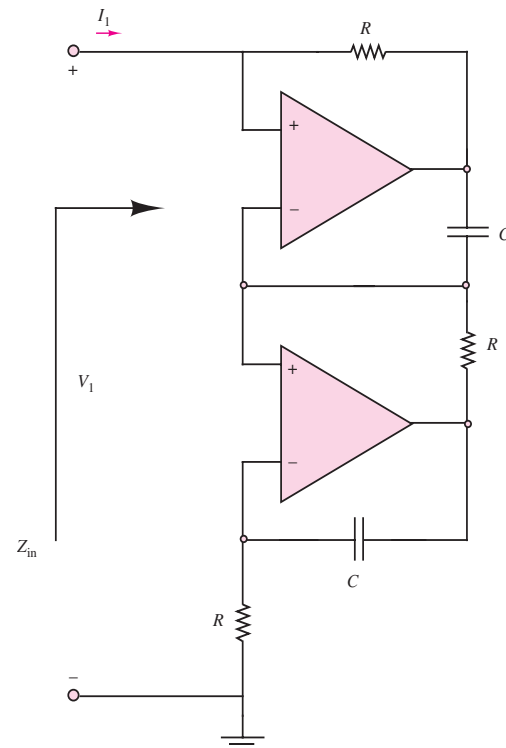**8.14** In the circuit of Figure P8.14, determine the impedance looking in.

Figure P8.14