

**2.122** Consider an op amp connected in the inverting configuration to realize a closed-loop gain of  $-100$  V/V utilizing resistors of  $1\text{ k}\Omega$  and  $100\text{ k}\Omega$ . A load resistance  $R_L$  is connected from the output to ground, and a low-frequency sine-wave signal of peak amplitude  $V_p$  is applied to the input. Let the op amp be ideal except that its output voltage saturates at  $\pm 10\text{ V}$  and its output current is limited to the range  $\pm 20\text{ mA}$ .

- (a) For  $R_L = 1\text{ k}\Omega$ , what is the maximum possible value of  $V_p$  while an undistorted output sinusoid is obtained?
- (b) Repeat (a) for  $R_L = 200\ \Omega$ .
- (c) If it is desired to obtain an output sinusoid of 10-V peak amplitude, what minimum value of  $R_L$  is allowed?

**2.125** What is the highest frequency of a triangle wave of 10-V peak-to-peak amplitude that can be reproduced by an op amp whose slew rate is  $20\text{ V}/\mu\text{s}$ ? For a sine wave of the same frequency, what is the maximum amplitude of output signal that remains undistorted?

**\*2.105** An op amp intended for operation with a closed-loop gain of  $-100$  V/V uses resistors of  $10\text{ k}\Omega$  and  $1\text{ M}\Omega$  with a bias-current-compensation resistor  $R_3$ . What should the value of  $R_3$  be? With input grounded, the output offset voltage is found to be  $+0.30\text{ V}$ . Estimate the input offset current assuming zero input offset voltage. If the input offset voltage can be as large as  $1\text{ mV}$  of unknown polarity, what range of offset current is possible?