

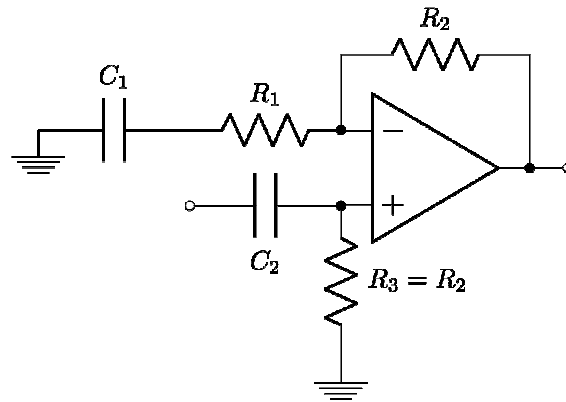
HW#2

(Submit to bCourses by 11 pm on 2/8)

- 1) Show that for the inverting amplifier if the op-amp gain is A , the input resistance is given by

$$R_{in} = R_1 + \frac{R_2}{A + 1}$$

- 2) A noninverting amplifier with a closed-loop gain of 1000 is designed using an op amp having an input offset voltage of 3 mV and output saturation levels of ± 12 V. What is the maximum amplitude of the sine wave that can be applied at the input without the output clipping? If the amplifier is capacitively coupled in the manner indicated below, what would the maximum possible amplitude be?



- 3) An inverting amplifier with nominal gain of -50 V/V employs an op amp having a dc gain of 10^4 and a unity-gain frequency of 10^6 Hz. What is the 3-dB frequency f_{3dB} of the closed-loop amplifier? What is its gain at $0.1 f_{3dB}$ and at $10 f_{3dB}$?
- 4) 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 V/ μ s? For a sine wave of the same frequency, what is the maximum amplitude of output signal that remains undistorted?