Electronic Circuits and Systems (EEE211)

Course Work: Assignment−3

Deadline: 01-December-2024, 23:59 @ LMO

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1) Consider the circuit shown in Figure 1. (a) Determine the ideal output voltage v_O if $v_I = -0.40$ V. (b) Assume the op-amp is ideal except it has a finite open-loop gain. Determine the actual output voltage if the open-loop gain of the op-amp is $A_{od} = 5 \times 10^3$. **[20 Marks]**

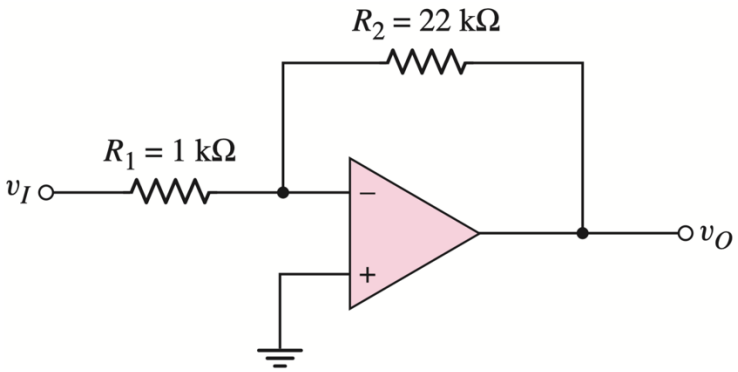

Figure 1

2) The op-amp in the circuit shown in Figure 2 is ideal except it has a finite open-loop gain. (a) If $A_{od} = 10^4$ and $v_o = -2$ V, determine v_I. (b) If $v_I = 2$ V and $v_o = 1$ V, determine A_{od}. **[20 Marks]**

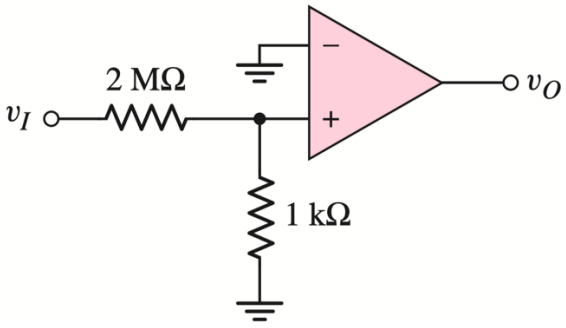

Figure 2

3) The parameters of the two inverting op-amp circuits connected in cascade shown in Figure 3 are $R_1 = 10$ k**Ω**, $R_2 = 80$ k**Ω**, $R_3 = 20$ k**Ω**, and $R_4 = 100$ k**Ω**. For $v_I = -0.15$ V, determine v_{O1}, v_O, i_1, i_2, i_3, and i_4. **[20 Marks]**

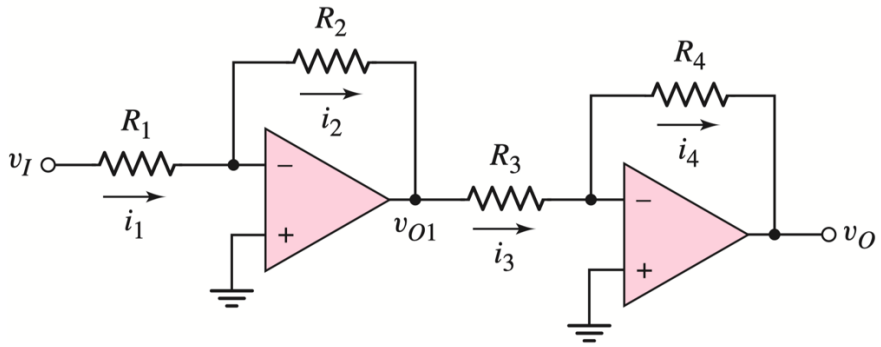

Figure 3

4) (a) If an op-amp has a slew-rate of 5 V/μs, find the upper corner frequency for a pulse output voltage of 5 V, 1.5 V, and 0.4 V. (b) An op-amp with a slew rate of 8 V/μs is driven by a 250 kHz sine wave. What is the maximum output amplitude at which slew-rate limiting is reached? **[20 Marks]**

5) For the circuit shown in Figure 4, the input bias current is $I_B = 0.8$ μA and the input offset current is $I_{OS} = 0.2$ μA. Determine the output voltage due to the effect of the input offset current. **[20 Marks]**

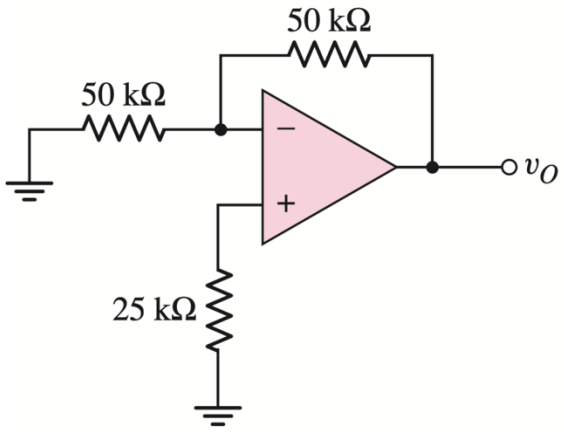

Figure 4