ECS 203: Problem Set 8

Semester/Year: **2/2014**

Course Title: Basic Electrical Engineering
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Questions

1) [Alexander and Sadiku, 2009, Q5.41] An averaging amplifier is a summing amplifier that provides an output equal to the average of the inputs. By using proper input and feedback resistor values, one can get

$$-v_o = \frac{1}{4}(v_1 + v_2 + v_3 + v_4)$$

Using a feedback resistor of 10 kΩ, **design** an averaging amplifier with four inputs.

2) [Alexander and Sadiku, 2009, Q5.47] The circuit in Figure 1 is for a difference amplifier. Find v_o given that v_1 =1V and v_2 = 2V
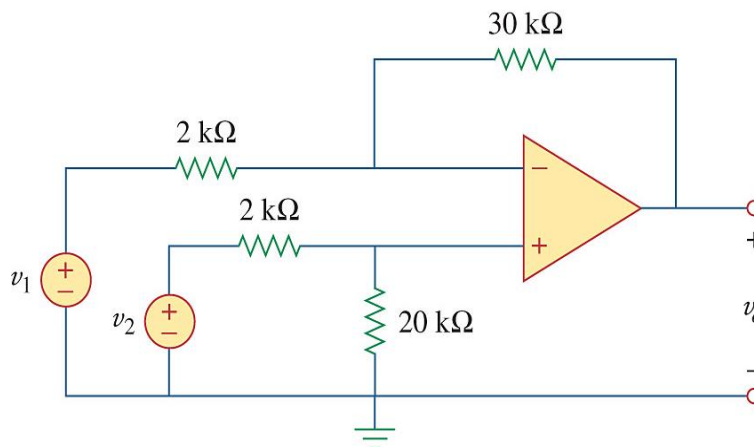

Figure 1

3) [Alexander and Sadiku, 2009, Q5.29] Determine the voltage gain v_o/v_i of the op amp circuit in Figure 2.

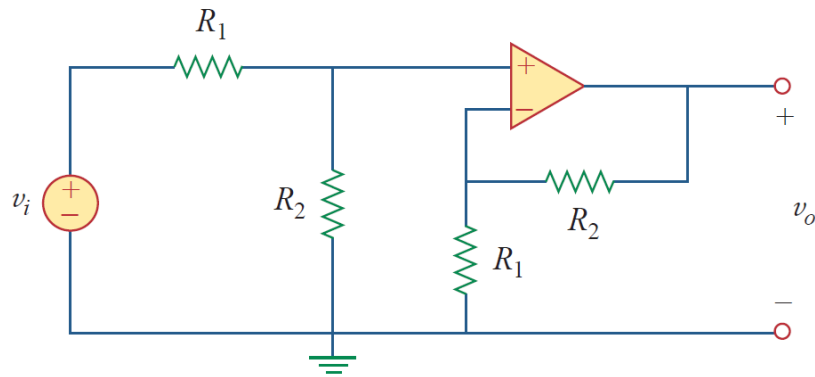

Figure 2

4) Use superposition theorem to derive the relation $v_o = -Av_1 + \dfrac{1+A}{1+B}v_2$ for the difference amplifier on page 70 of the lecture note.

5) [Alexander and Sadiku, 2009, Q5.57] Find v_o in the op amp circuit of Figure 3.
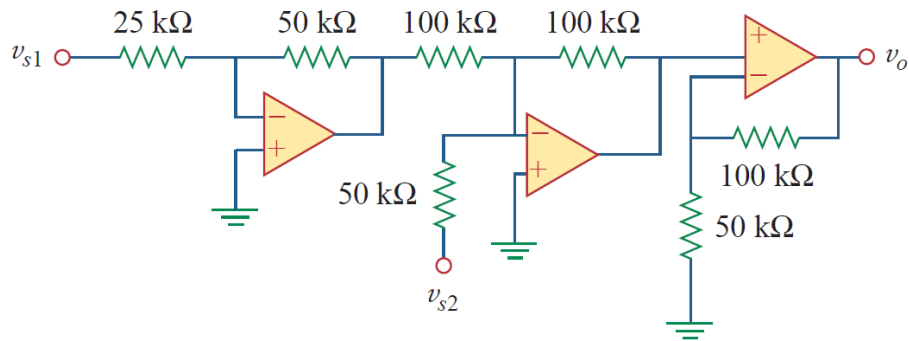

Figure 3

6) [Alexander and Sadiku, 2009, Q5.49] Design a circuit to amplify the difference between two inputs by 2.
   a) Use only one op amp.
   b) Use exactly two op amps.