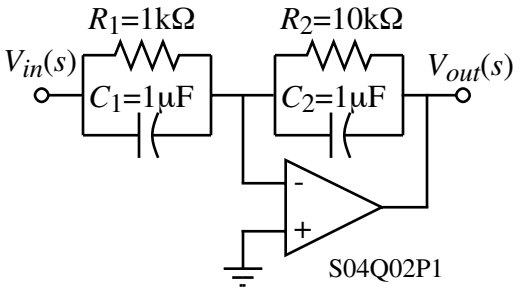
Homework Assignment No. 3

Due on **Wednesday**, September 8, 2004

1.) A circuit using an ideal op amp is shown.
(a.) Find the *s*-domain transfer function, $V_{out}(s)/V_{in}(s)$ and solve for the numerical values of all roots.
(b.) Assuming the answer to part (a.) is given below, sketch an asymptotic magnitude and phase frequency response of this transfer function.



S04Q02P1

$$\frac{V_{out}(s)}{V_{in}(s)} = -10\left(\frac{s+100}{s+10}\right)$$

2.) The differential amplifier below uses an ideal op amp. Find the values of R_1, R_2, R_3 and R_4 if the single-ended input resistances, R_{in1} and R_{in2} are to be 100kΩ and the output voltage is to be $v_{out} = 10(v_1 - v_2)$.

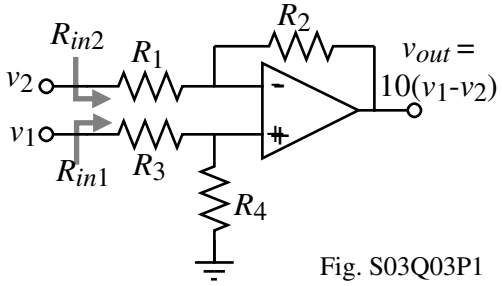
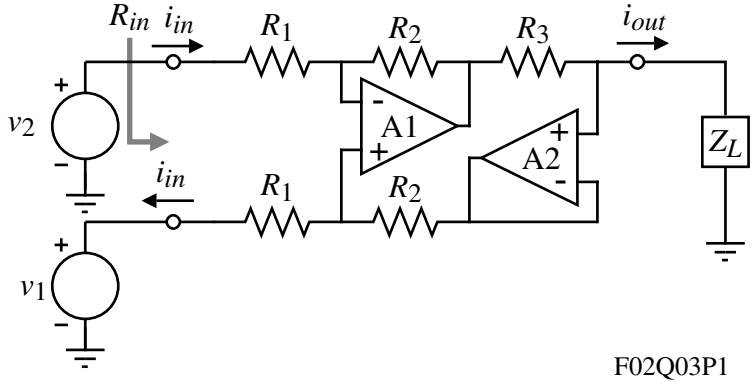


Fig. S03Q03P1

3.) Assume that the op amps are ideal and find i_{out} as a function of the inputs ,v_1 and v_2. Find the input resistance defined as $R_{in} = (v_2 - v_1)/i_{in}$.



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4.) Problem 11.38 (12.24) of the text [Ans. $v_{o2} = -\frac{R_2}{R_1} v_s$. and $v_{o1} = -\left(\frac{R_2}{R_1} + \frac{R_3}{R_1}\right) v_s$]

5.) Problem 11.39 (12.29 modified – see second edition) of the text.

6.) Problem 11.98 (12.74) of the text