Analog electronics, Fall 2012

Exercise 2, 16.11.2010

1.

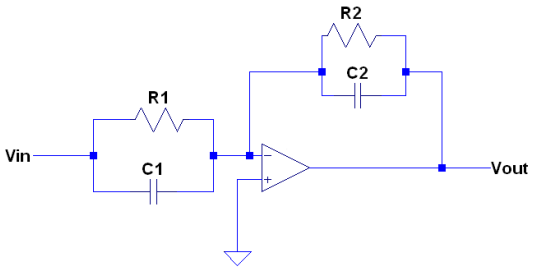
Derive the transfer function of the inverting opamp circuit. Derive the expression for the frequency response using the integrator model for opamps.

2.

a) Derive the transfer function and frequency response of the circuit depicted below. Give the transfer function in the following form:

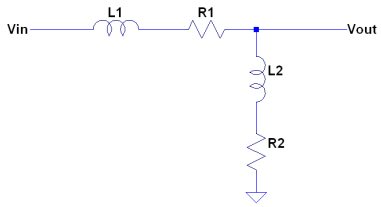
$$T(s) = K\frac{s+z_1}{s+p_1}$$

b) What is the filter type (low- / high-pass, etc.)? ($C_1 = 10nF$, $R_1 = 1k\Omega$, $C_2 = 10nF$, $R_2 = 10k\Omega$).



3.

Derive the transfer function and frequency response of the circuit depicted below. What is the filter type (low- / high-pass, etc.)?$R_1 = R_2 = 1k\Omega$, $L_1 = 10mH$, $L_2 = 1mH$.



4.

The transfer function of a filter is:

$$T(s) = \frac{s+z_1}{s+p_1}\frac{s+z_2}{s+p_2},$$

where $z_1 = 10^3$, $z_2 = 10^6$, $p_1 = 10^4$, $p_2 = 10^5$ (in the units of angular frequencty). What is the filter type? Determine the asymptotic Bode plot for the filter. Implement the filter using two opamps, resistors and capacitors.