Spring 2004; E4215: Analog Filter Synthesis and Design; HW0

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This assignment has ZERO credit and does not contribute to the final grade. Its purpose is to gauge your familiarity of prerequisite topics.

1. Check the terms that are unfamiliar to you:
   - Laplace transform
   - Impulse response
   - Frequency response
   - Transfer function
   - Bode plot
   - Operational amplifier
   - Bipolar transistor
   - MOS transistor
   - Common drain amplifier
   - Loop gain
   - Gain margin
   - Phase margin
   - dB units
2. The circuit in Fig. 1 is _____

   V_x =

   V_y =
3. Transfer function of the circuit in Fig. 2:

   $\frac{V_o(s)}{V_i(s)}$ =

   pole of the circuit =

   zero of the circuit =

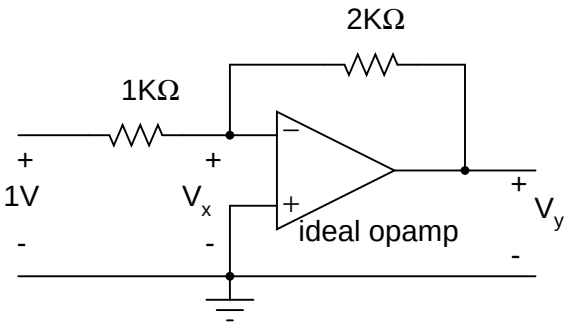

Figure 1:

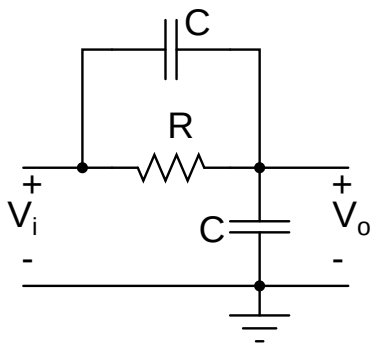

Figure 2:

4. In Fig. 3

   $V_o =$
5. Transfer function of the circuit in Fig. 4:

   $\frac{V_o(s)}{V_i(s)} =$
6. In Fig. 5:

   $\frac{v_o}{v_i} =$

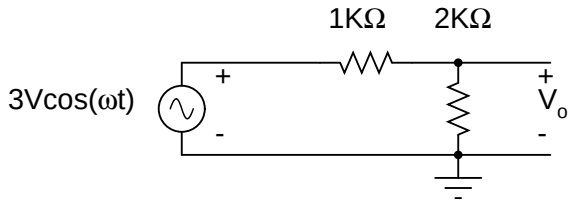

Figure 3:

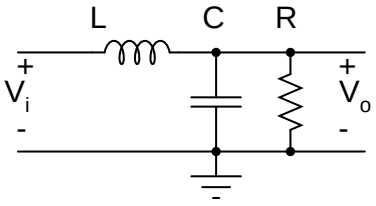

Figure 4:

7. In Fig. 5, if $R_L = r_{ds} = 1k\,\Omega$, and $g_m = 4\,\text{mS}$, what is $\frac{v_o}{v_i}$ in dB?

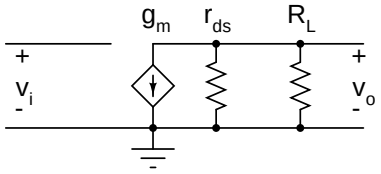

Figure 5: