

E4215: Analog Filter Synthesis and Design: HW0

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due on 21 Jan. 2003

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
- Small signal equivalent circuit
- Common drain amplifier
- Loop gain
- Gain margin
- Phase margin

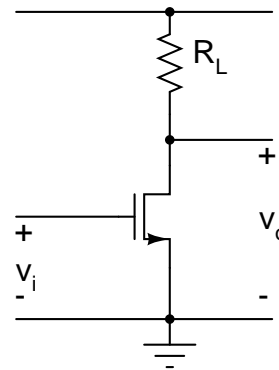


Figure 1:

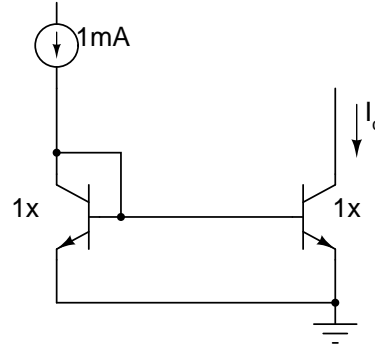


Figure 2:

2. The circuit in Fig. 1 is _____

$$\frac{v_o}{v_i} =$$

3. The circuit in Fig. 2 is _____

$$I_c =$$

4. The circuit in Fig. 3 is _____

$$\frac{v_o}{v_i} =$$

5. The circuit in Fig. 4 is _____

6. The circuit in Fig. 5 is _____

$$V_x =$$

$$V_y =$$

7. Transfer function of the circuit in Fig. 6:

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

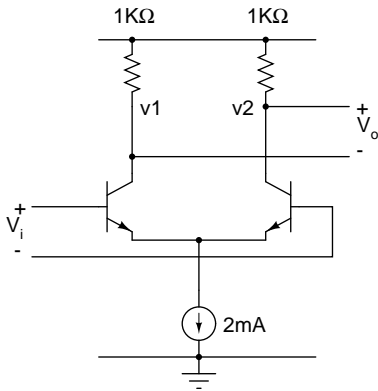


Figure 3:

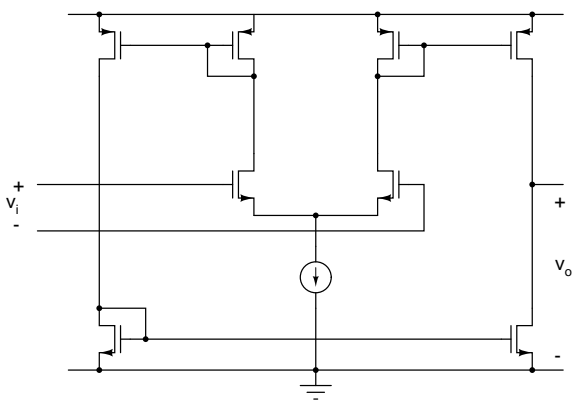


Figure 4:

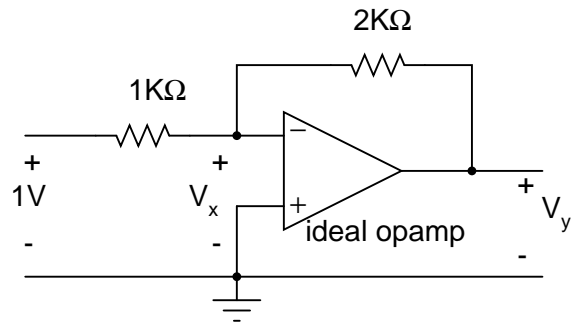


Figure 5:

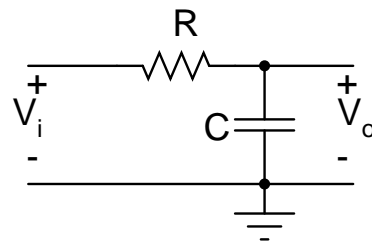


Figure 6:

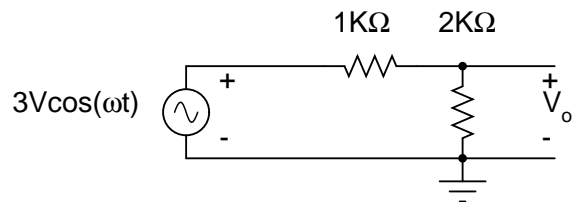


Figure 7:

8. In Fig. 7

$$V_o =$$

9. Transfer function of the circuit in Fig. 8:

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

10. In Fig. 9:

$$\frac{v_o}{v_i} =$$

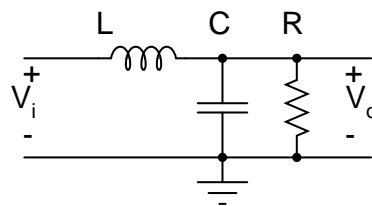


Figure 8:

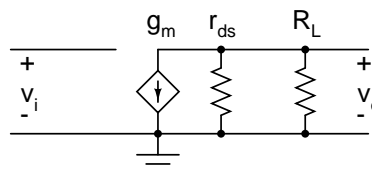


Figure 9: