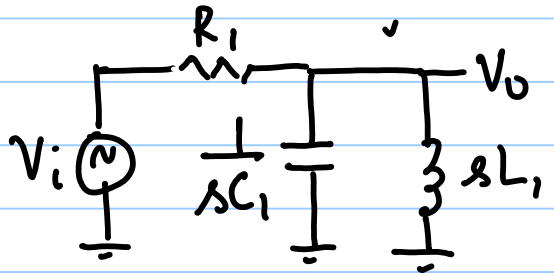
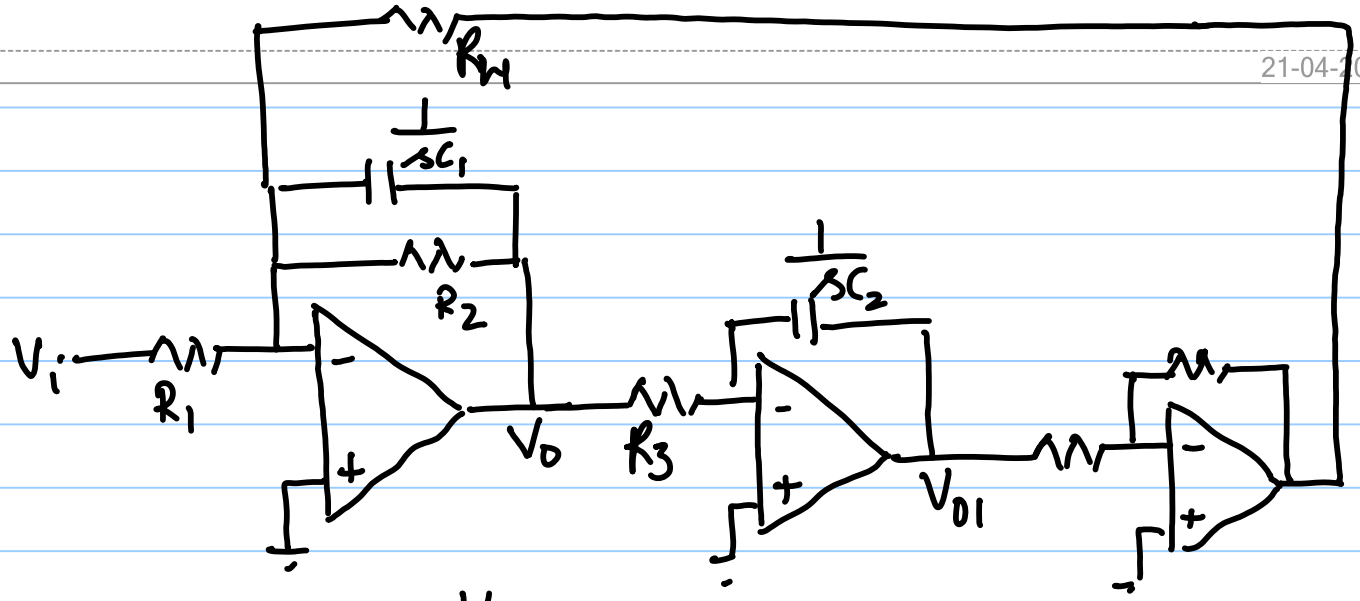
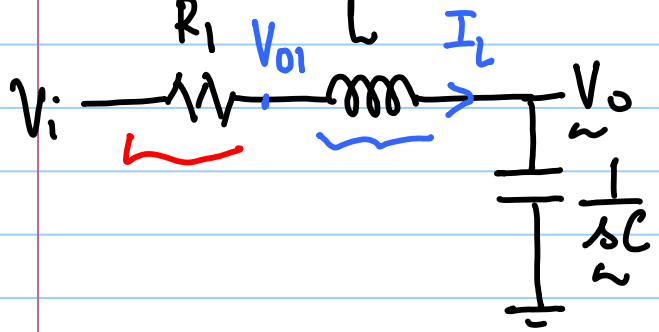
Lecture # 36

Note Title

21-04-2021







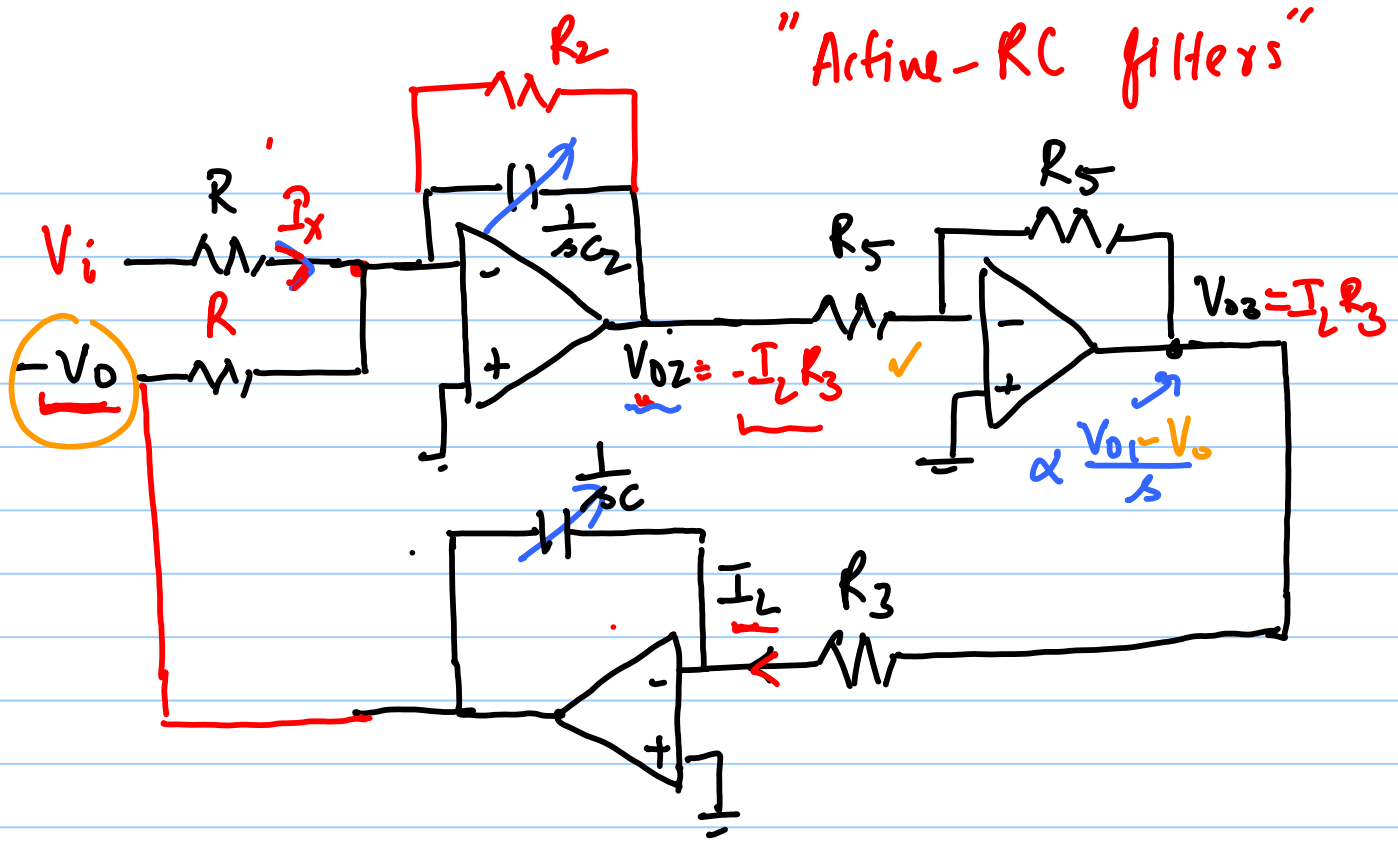
$$I_L = \frac{V_i - V_{01}}{R_1}$$

$$\frac{V_{01} - V_o}{sL} = I_L \checkmark$$

$$\frac{V_o}{V_i} = \frac{1/sC}{\frac{1}{sC} + sL + R_1} = \frac{1}{1 + sR_1C + s^2LC}$$

- I_L is integrated over capacitor C to give V_o
- $I_L \propto \boxed{\frac{V_{01} - V_o}{s}}$ ✓

"Active-RC filters"



$$V_{02} = -\frac{(V_{01} - V_0)}{R \times sC_2}$$

$$V_{02} \propto -\frac{(V_{01} - V_0)}{s} \checkmark$$

$$V_{03} = -V_{02}$$

$$I_2 = \frac{V_{03}}{R_3}$$

$$= \frac{(V_{01} - V_0)}{sR_3RC_2}$$

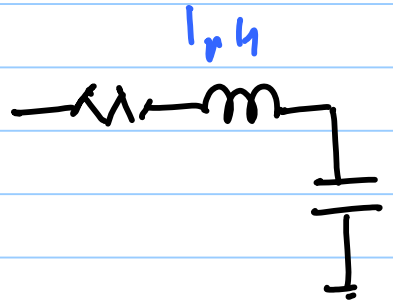
$$L = R_3 R C_2$$

$$V_{04} = -\frac{I_2}{sC} = -\frac{(V_{01} - V_0)}{(sC)(sR_3RC_2)} = -V_0$$

$$I_2 = \frac{V_i - V_{01}}{R_1} \Rightarrow \frac{V_{01}}{R_1} = \frac{V_i}{R_1} - I_2$$

$$= \frac{V_i}{R_1} - \frac{I_2 R_3}{R_3}$$

$$\frac{V_o}{V_i} = \frac{1}{1 + sCR + s^2C(C_2R_3R)}$$



$$\frac{V_{o1}}{R_1} = \frac{V_i}{R_1} + \frac{V_{o2}}{R_3}$$

$$\frac{V_{o1}}{R} = \frac{V_i}{R} + \frac{V_{o2}}{\frac{R \cdot R_3}{R_1}}$$

$$\frac{R_1}{R_2}$$