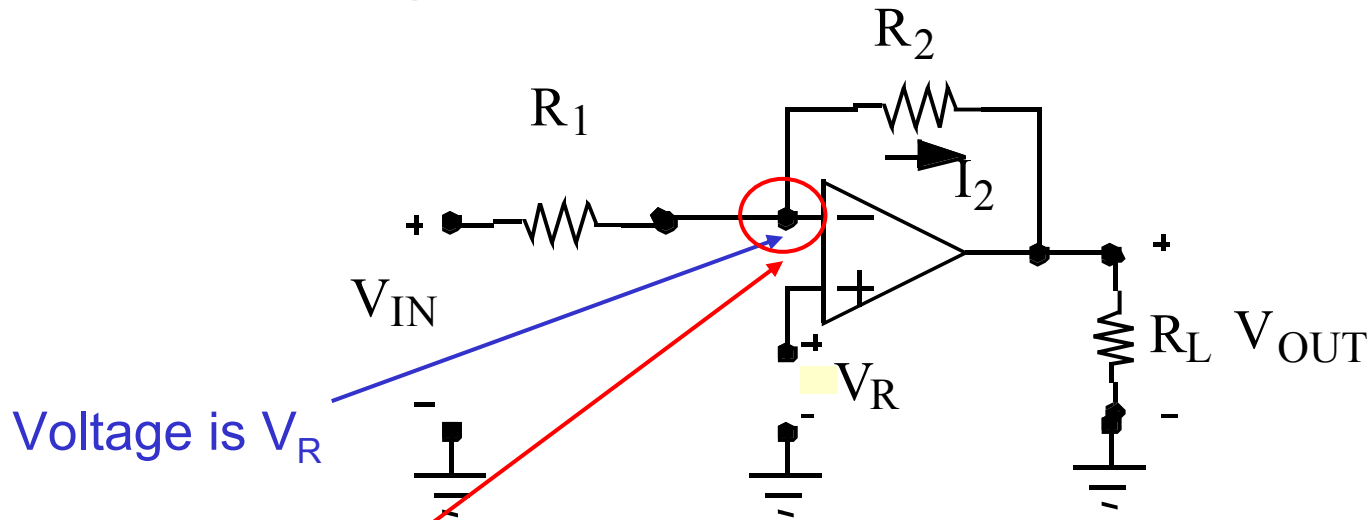

EE40
Lecture 24
Venkat Anantharam

3/31/08

Reading: Chap. 14: Operational
Amplifiers.

Ideal Op-Amp Analysis: Inverting Amplifier

Yes Negative Feedback is present in circuit!



Only two currents for KCL

$$\frac{V_R - V_{IN}}{R_1} + \frac{V_R - V_{OUT}}{R_2} = 0$$

$$V_{OUT} = V_R - \frac{R_2}{R_1} (V_{in} - V_R)$$

Inverting Amplifier with reference voltage

Inverting Amplifier

- Negative feedback → checked
- Use summing-point constraint

$$\text{Closed loop gain} = A_v = \frac{v_o}{v_{in}}$$

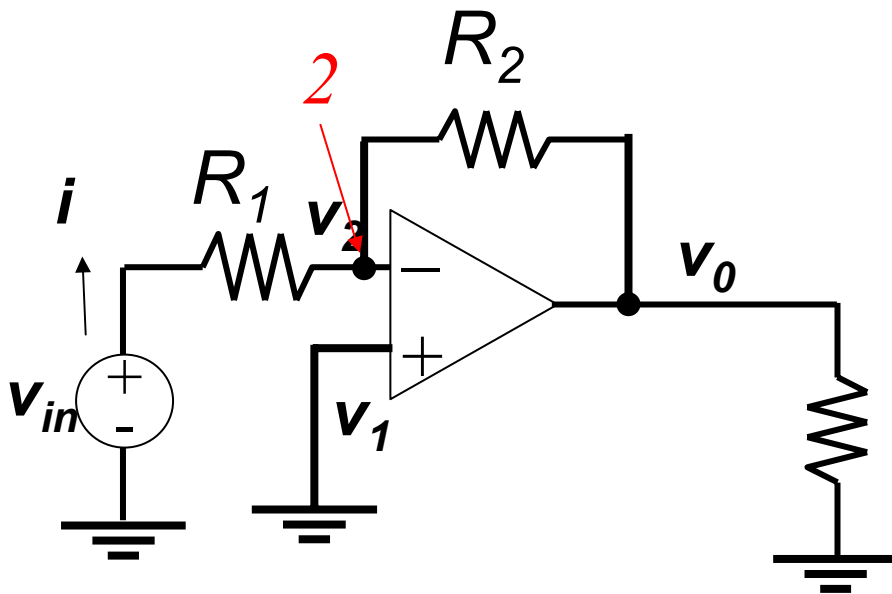
$$v_1 = v_2 = 0, i_1 = i_2 = 0$$

Use KCL At Node 2.

$$i = \frac{(v_{in} - v_2)}{R_1} = \frac{(v_{out} - v_2)}{R_2}$$

$$v_o = -\frac{R_2 v_o}{R_1}$$

$$R_L \text{ Input impedance} = \frac{v_{in}}{i} = R_1$$



Ideal voltage source – independent of load resistor