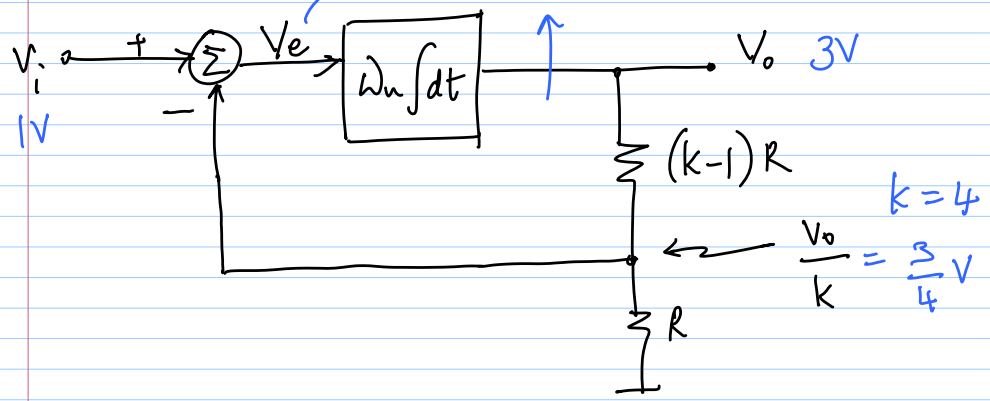
3/3/15

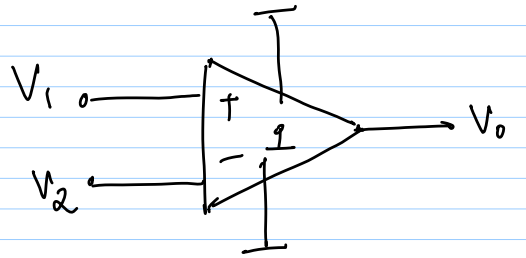
# Lec 21

$V_e = V_i - \frac{V_o}{k}$




Compare $V_o$ & $kV_i$ ⟷ Compare $\frac{V_o}{k}$ & $V_i$

* $V_o$ doesn't change only when $V_e = 0$
* In steady state, $V_o = 4V$

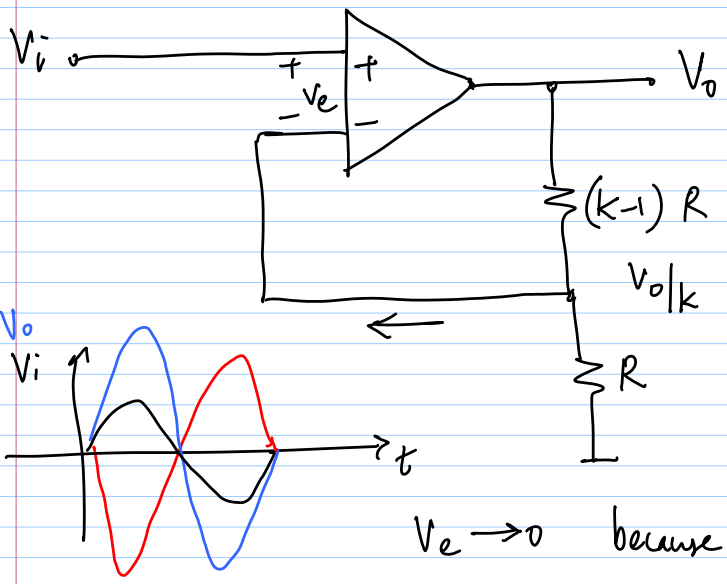



operational amplifier (op. amp)

$V_o = A_o(V_1 - V_2)$ ; $A_o$ is very large

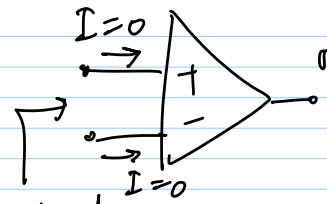
$A_o \to \infty$

$V_e = V_1 - V_2$ or $V_+ - V_-$



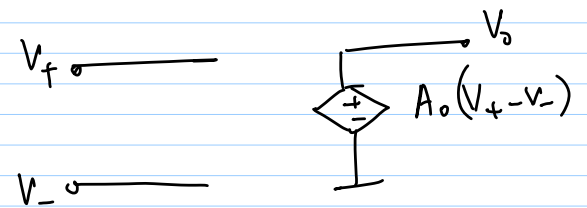

Non-inverting amplifier gain $k > 1$

$V_e \to 0$ because $A_o \to \infty$

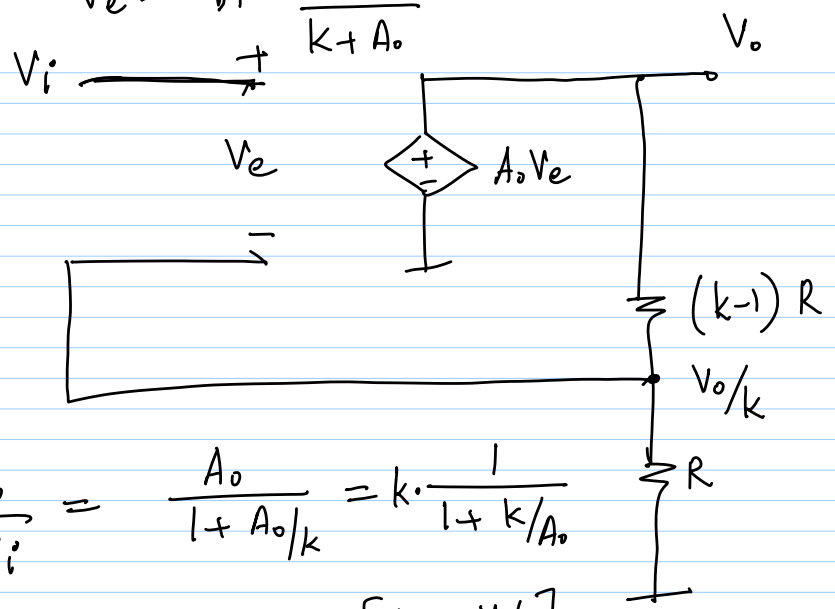



only when placed in negative feedback, opamp creates combination of short ckt & open ckt.

Virtual short {virtual gnd}

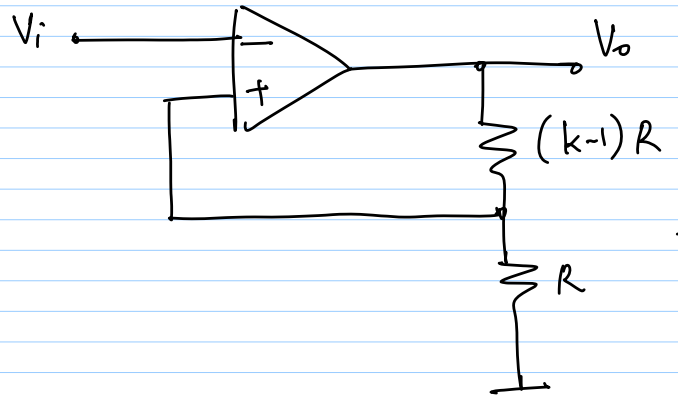


$$V_e = V_i \cdot \frac{k}{k + A_0}$$




$$\frac{V_o}{V_i} = \frac{A_0}{1 + A_0/k} = k \cdot \frac{1}{1 + k/A_0}$$

$$V_o = A_0 V_e = A_0 \left[ V_i - V_o/k \right]$$




+ve f-b.

→ do not use VCVS model