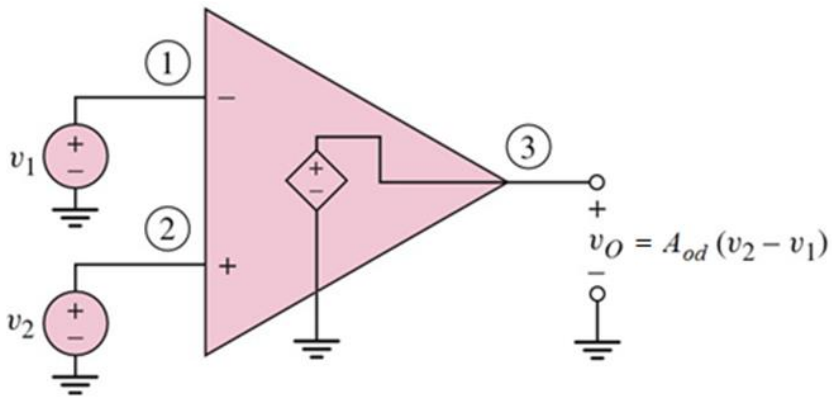
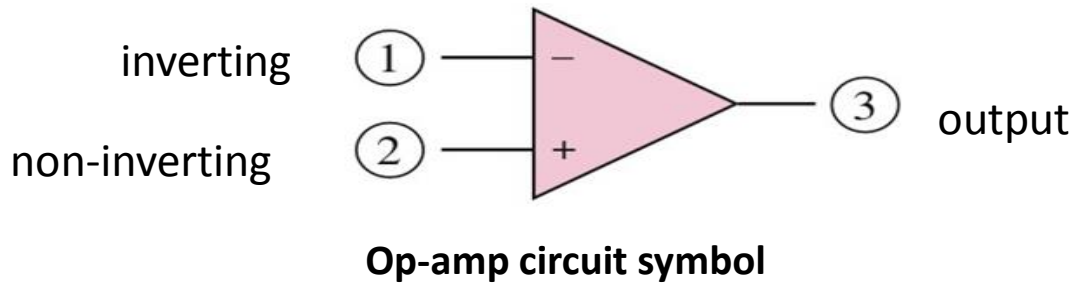
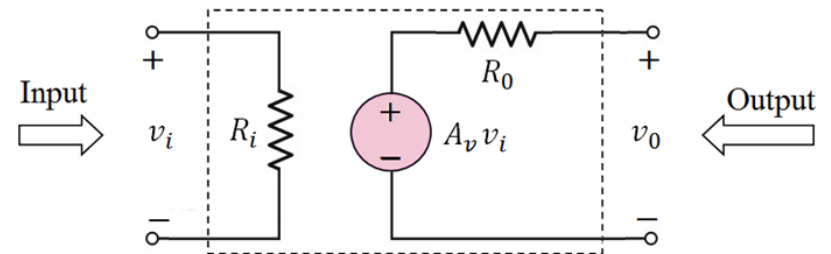


CHAPTER 8

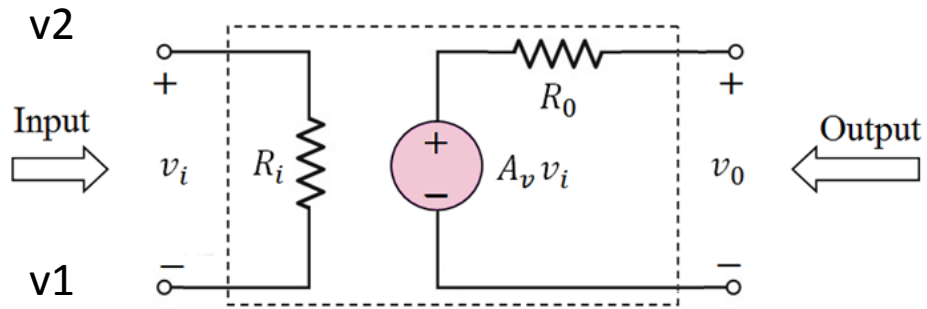
IDEAL OPERATIONAL AMPLIFIER AND OP-AMP CIRCUITS



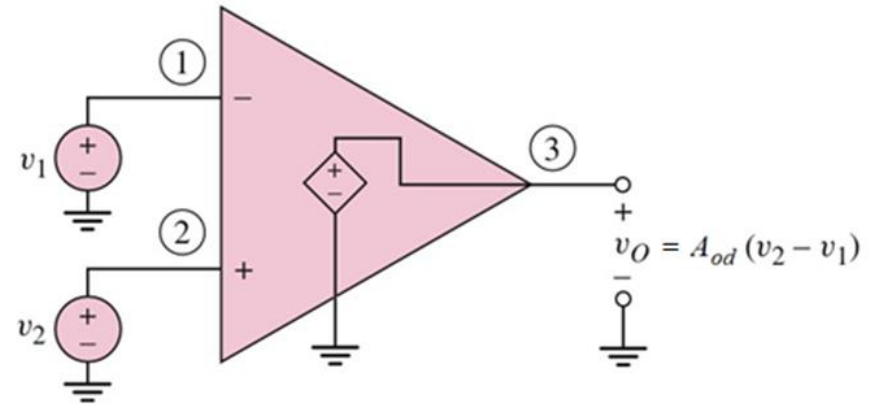
- **Open loop mode**
- $V_O = A_{od}(v_2 - v_1)$
 - A_{od} is referred to as the open loop gain.
 - Notice that if $v_2 = v_1$, the open loop gain equals to ∞

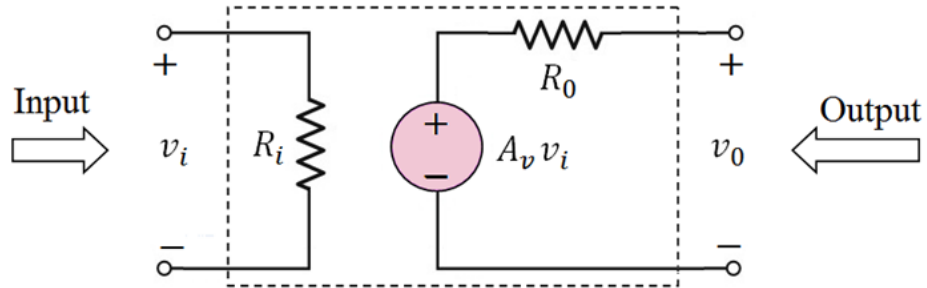


Equivalent circuit of a voltage amplifier

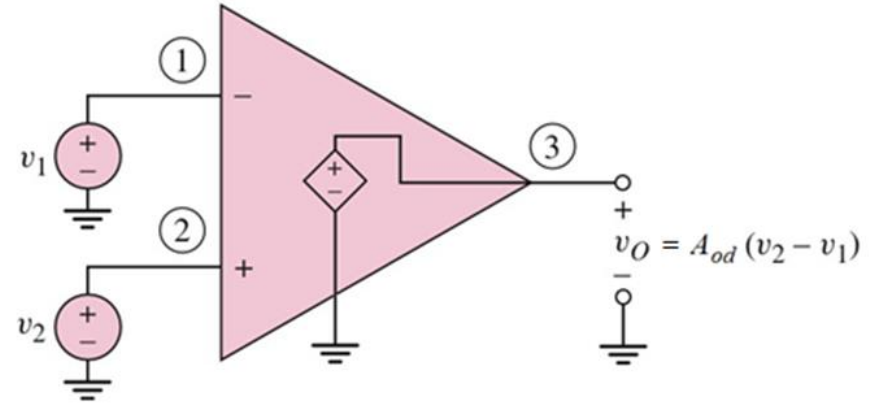


Equivalent circuit of a voltage amplifier



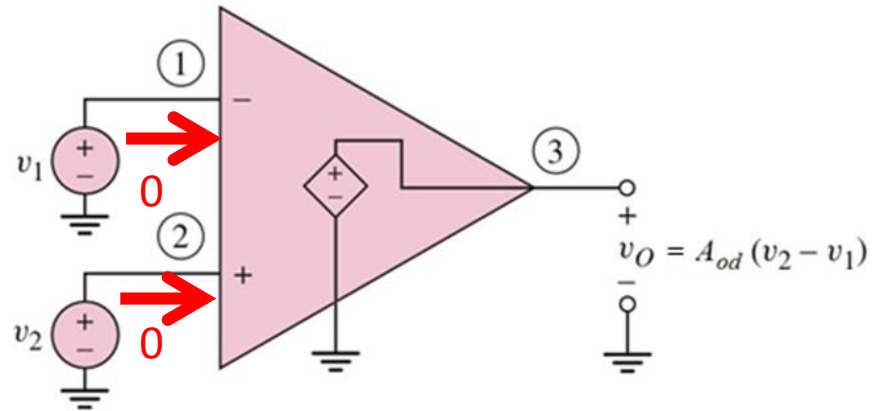


Equivalent circuit of a voltage amplifier



- Two main characteristics:

- We want the open loop gain to be equal to ∞ which means that $v_2 = v_1$



- the input resistance to be equal to ∞ , hence there is no current going into the op-amp

- Op amp can be configured to be used for different type of circuit applications:
 - **Inverting Amplifier**
 - **Non – inverting Amplifier**
 - **Summing Amplifier**
 - **Integrator**
 - **Differentiator**

- Calculate gain i.e $v_{\text{out}}/v_{\text{in}} \rightarrow$ no unit
- From the gain, you can be asked to calculate the output voltage if input voltage is given
- Gain can be negative or positive value
- Gain can also be less than $|1|$