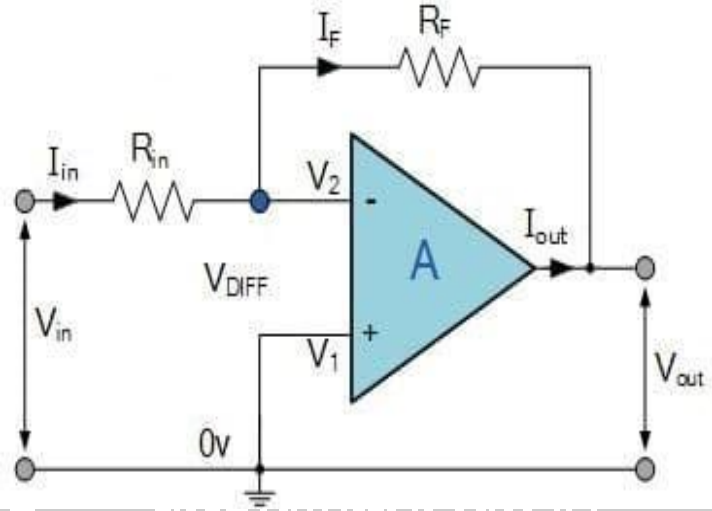
4.4 INVERTING AMPLIFIER

In an inverting amplifier circuit, the operational amplifier inverting input receives feedback from the output of the amplifier. Assuming the op-amp is ideal and applying the concept of virtual short at the input terminals of op-amp, the voltage at the inverting terminal is equal to non-inverting terminal. The non-inverting input of the operational amplifier is connected to ground. As the gain of the op amp itself is very high and the output from the amplifier is a matter of only a few volts, this means that the difference between the two input terminals is exceedingly small and can be ignored. As the non-inverting input of the operational amplifier is held at ground potential this means that the inverting input must be virtually at earth potential.

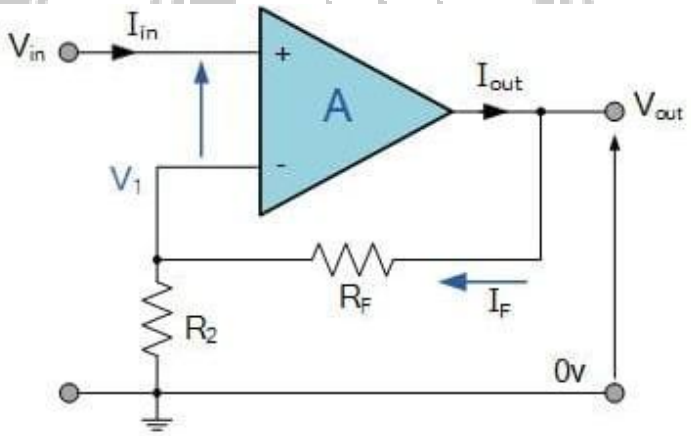


Applying KCL at inverting node we can calculate voltage gain,

Voltage gain (A)= $V_{out}/ V_{in} = – R_f/R_{in}$

NON-INVERTING AMPLIFIER

Non-Inverting amplifier is one in which the output is in phase with respect to the input. The feedback is applied at the inverting input. However, the input is now applied at the non-inverting input. The output is a non-Inverted (in terms of phase) amplified version of input. The gain of the non-inverting amplifier circuit for the operational amplifier is easy to determine. The calculation hinges around the fact that the voltage at both inputs is the same. This arises from the fact that the gain of the amplifier is exceedingly high. If the output of the circuit remains within the supply rails of the amplifier, then the output voltage divided by the gain means that there is virtually no difference between the two inputs.



The voltage gain can be calculated by applying KCL at the inverting node.

Voltage gain (A) = $V_{out}/ V_{in} = (1+ R_f/R_{in})$