



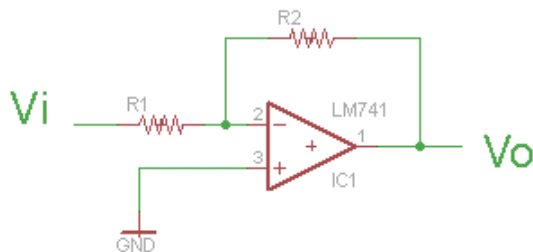
FORMULAS

The following formulas and information are meant to go with the online lesson found here:
<http://www.pyroelectro.com/edu/basics/opamp/>

THE TWO MAIN OP-AMP FORMULAS

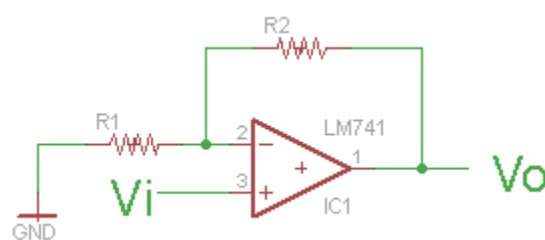
Operational Amplifier devices offer us two primary ways to amplify an incoming signal. One is called the 'Non-Inverting' Amplifier and the other is called the 'Inverting' Amplifier. The naming is straight forward, one amplifier outputs an inverted and amplified signal, and the other outputs an amplified and non-inverted signal.

Inverting Amplifier



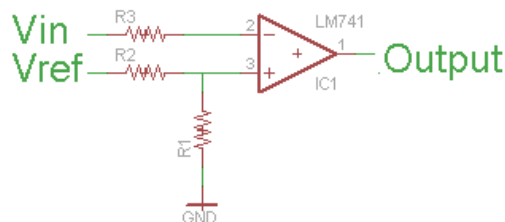
$$V_o = \left(-\frac{R2}{R1}\right) * V_i$$

Non-Inverting Amplifier



$$V_o = \left(1 + \frac{R2}{R1}\right) * V_i$$

We also built a **comparator** in the introduction of this lesson. Below is a similar circuit to what we built and to the right you can see the two cases of how the **Vin** or the input is compared to **Vref**.



Case 1:

If **Vref** is larger than **Vin**, output will be **HIGH** or **V+**

Case 2:

If **Vref** is smaller than **Vin**, output will be **Low** or **V-**

ADDITIONAL INFORMATION

If you have any questions about the formulas or information found in this document, please feel free to head on over to the forums and ask us some questions!

<http://www.pyroelectro.com/forums/>