

Lab 5 FYSS 385

LabVIEW has the ability to control interfaces that produces outputs and measure inputs. This allows test systems to measure the parameters of systems. Usually, the output parameters are voltages or pulses and the input data is also voltages or pulses. Voltage measurements can indirectly measure other parameters such as current, power, temperature etc. by means of sensors.

Consider we want to measure the two terminal current-voltage characteristics of an electronic device. We are interested in the current as a function of voltage.

We could sweep the voltage and measure the current at each voltage.

Recollecting, parametric equations from mathematics we can write:

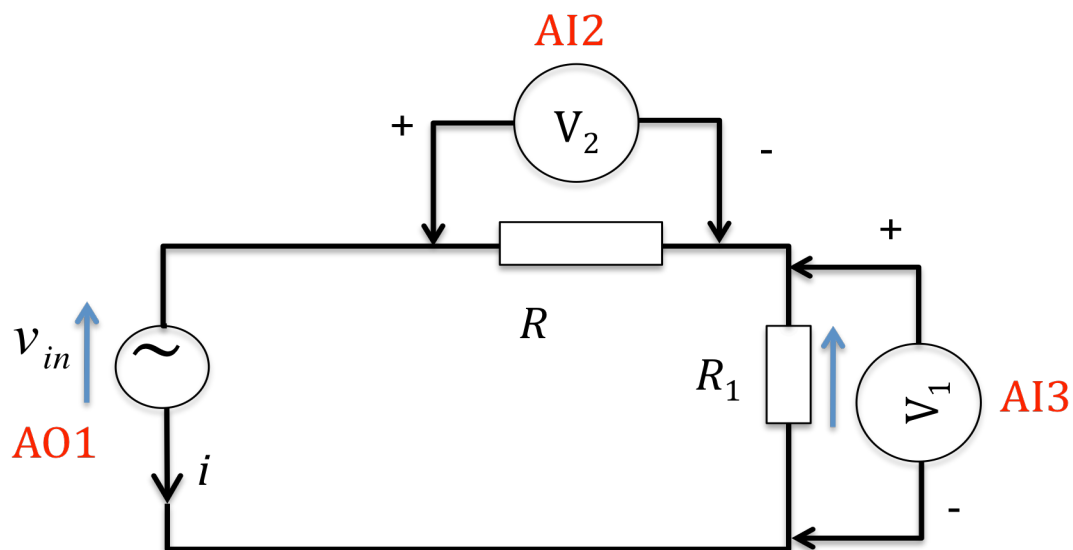
$v = v(t); i = i(t)$. Then the voltage and current are a function of time. We can

then sweep, or step the voltage or current and measure the current. We will see

we can use this to simply measure the threshold voltage of a two-terminal device such as a diode or transistor.

Set-up a circuit to measure the current and voltage across a two-terminal device.

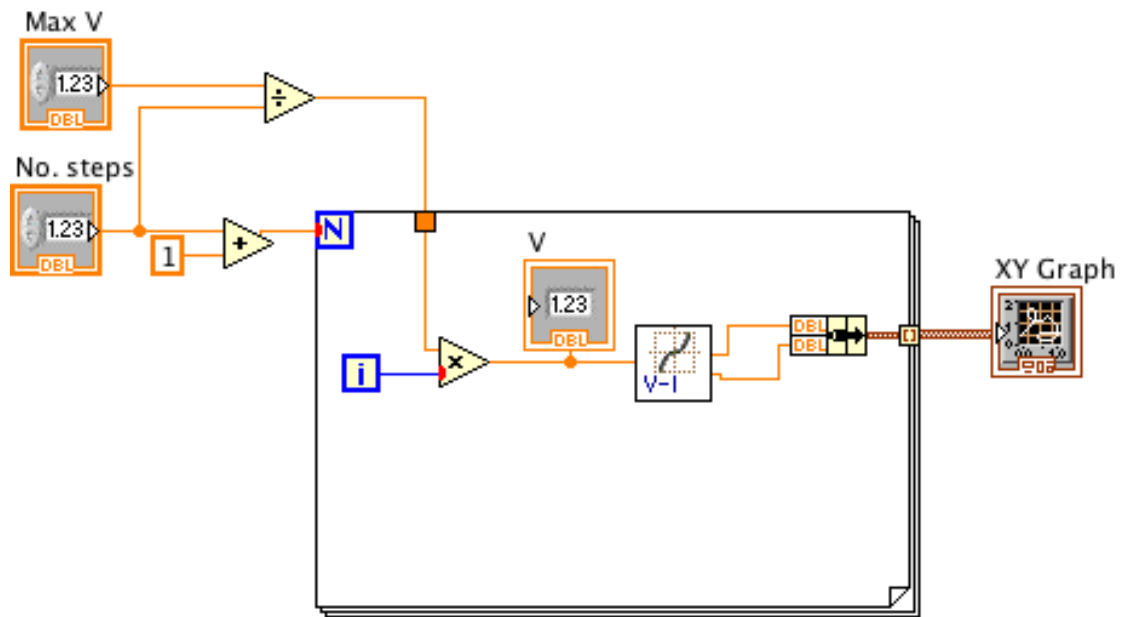
This is very similar to the thermometer VI from Lab 2.



The VI should have terminals for standard error cluster, and the input voltage and output terminals for the standard error cluster and the voltage across the device and current through the device.



- We now generate a step voltage and feed to this to the V-I array.. The XY waveform display is used to display the result.

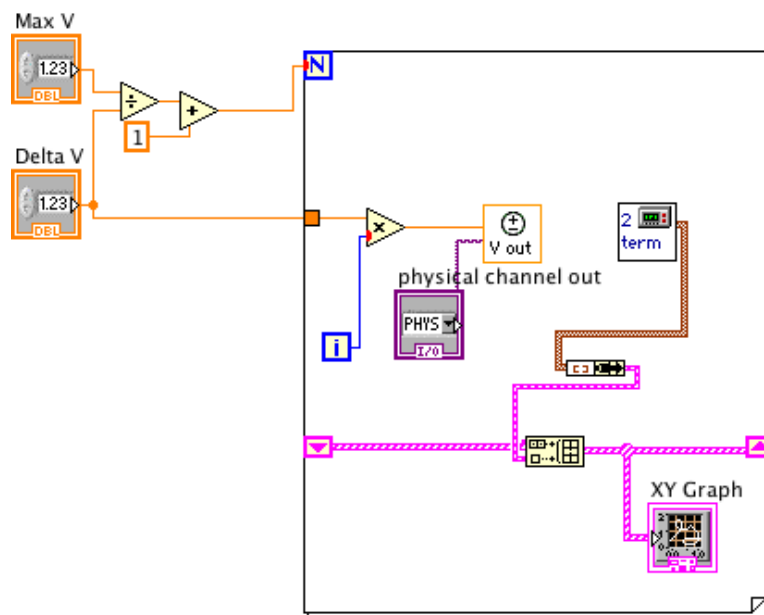


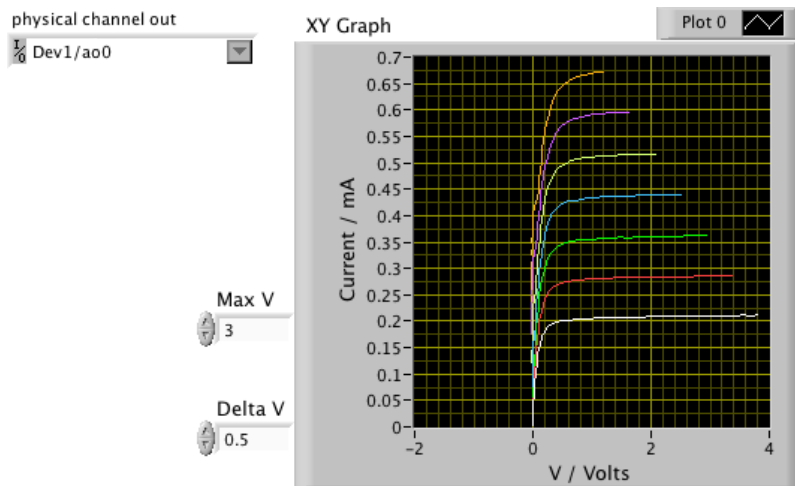
- Replace the diode with a resistor – what I-V curve is expected.
- Replace the resistor with a LED. What is the difference between the Si-diode and the LED?

2. In the next part of the Lab we demonstrate a 3-terminal analyser. We will investigate a small signal Si-FET type BF245A.

<http://pdf1.alldatasheet.com/datasheet-pdf/view/16196/PHILIPS/BF245A.html>

We step the gate voltage and measure the I-V curve at each step. The graph is then plotted.





Reporting

- Write and maybe design a VI to measure the threshold voltage of a diode.
- Look up the difference between large signal G_m and small signal g_m parameters of a FET. Suggest briefly how we could make a VI to measure these.