#### UNIVERSITY OF CALIFORNIA AT BERKELEY

College of Engineering
Department of Electrical Engineering and Computer Sciences

#### EE105 Lab Experiments

# HP 34401A Digital Multimeter Tutorial

#### 1 Introduction

The DMM is simple, so this tutorial only contains a few bulleted notes and two simple examples. There is an image of the front panel interface in Figure 1.

### 2 Interface Notes

- To measure DC or AC current or voltage, use the two leftmost buttons in the FUNCTION section. The current options are in blue, and require use of the Shift key.
- Use the blue Shift key to select options labeled in blue. For example, to measure DC current, first press Shift and then press the upper-left button labeled "DC I" in blue.
- To measure voltage or resistance, plug in the probes as in Figure 1. To measure current, you must switch the red probe to the lower-right input port (labeled "I").
- AC voltage measures  $V_{rms}$ .
- When measuring a current, never place the probes across a voltage source. The ammeter has a very small internal impedance, and so a voltage source would need to drive a very high current through the ammeter to maintain its voltage output. High currents may damage the DMM.
- The DMM ground is floating, so you can always measure voltage differences with the two probes. Other devices are earth-grounded, and so can only measure a voltage difference from earth ground.



**Figure 1:** HP34401A front panel. The input cables on the right are set to measure voltage. To measure a current, the red cable is moved to the bottom-right port.

3 EXAMPLES 2

## 3 Examples

#### 3.1 Measuring DC Voltage

Here are all of the steps necessary to measure a DC voltage between nodes.

- 1. Press the power button on the left.
- 2. Press the DC V button on the left side of the Function section.
- 3. Be sure that the probes are plugged into the DMM in the voltage configuration; the black probe should be in the right LO port, and the red probe should be in the right HI port as in Figure 1.
- 4. Place the probe tips on the nodes to measure.

#### 3.2 Measuring DC Current

Here are all of the steps necessary to measure a DC current through a branch.

- 1. Press the power button on the left.
- 2. Press the Shift button, and then the button labeled with the blue "DC I."
- 3. Be sure that the probes are plugged into the DMM in the current configuration; the black probe should be in the right LO port, and the red probe should be in the right I port (in the bottom-right).
- 4. Place the probe tips in series with the branch that you want to measure.