

1.5 Data reduction

1. Using data from Procedure 1,

- (a) plot current i vs. V , i.e. plot V as the independent variable and i as the dependent variable.
 (b) Connect the points by a straight line, i.e. draw a straight line as close as possible to the points or fit the points with a computer (e.g. using Excel or Matlab/GNU Octave).
 (c) Get the slope and derive the resistance of the 11 m wire.
 (d) Determine the uncertainty in R , σ_R .

2. Using data from Procedure 2,

- (a) For every value of l , calculate the resistance R from the corresponding i , V measurements.
 (b) Plot R vs. the length of the wire. Connect the points by a straight line.
 (c) For the lab write-up calculate the cross sectional area A and diameter d of the wire.
 (d) Calculate their uncertainties σ_A and σ_d .

1.6 Questions

1. What conclusion can you draw from your data reduction?
 2. Do the experimental points really fall on a straight line in your two plots? Give some discussion.

Write the answers on the Data Sheet.

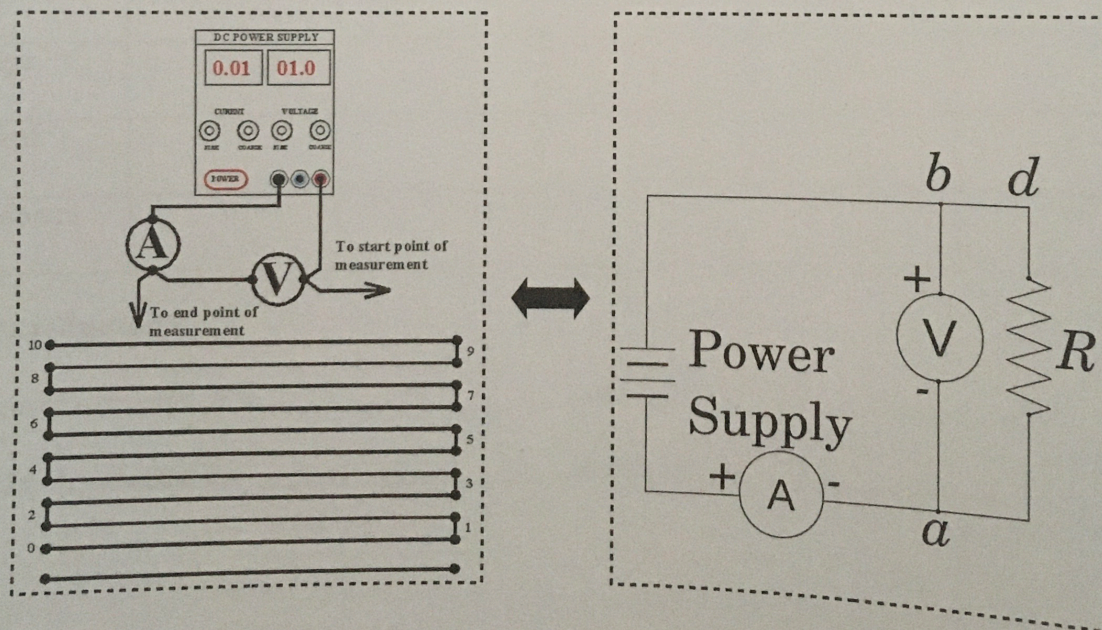


Figure 1.1: Apparatus (left) and corresponding schematic diagram (right).

$$R(m) = m^{-1}$$

$$\sigma_R = R'(m) \cdot \delta m$$

$$= -m^{-2} \cdot \delta m$$

$$\sigma_R = \frac{\delta m}{m^2}$$

Data for Q (1)

<u>Voltage</u>	<u>Amp</u>
1.046	0.01
2.083	0.02
3.153	0.03
4.152	0.04
5.200	0.04
5.460	0.06
6.520	0.07

Data for Q (2)

	<u>Voltage</u>	<u>Amp</u>
2 meter	1.075	0.06
4 meter	1.064	0.03
6 meter	1.053	0.02
8 meter	1.043	0.01
10 meter	1.033	0.01