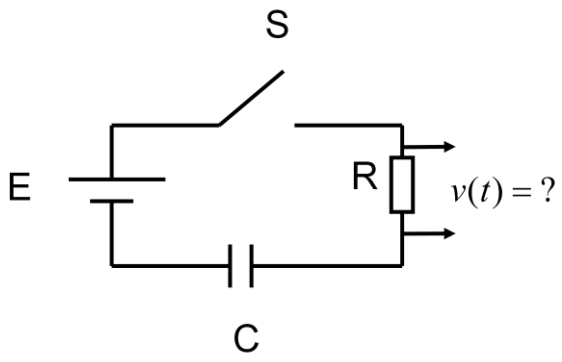
Assignment 3: Non-linear curve fitting

In a RC circuit shown in the figure, when the switch S is closed, the voltage v across the resistor R is a function of time t. The following table lists the recorded data (totally 15 points) measured during the first 30 seconds. Write a program using a language of your choice to best fit the data to the non-linear function $v = Ee^{(-\frac{t}{RC})}$ and then demonstrate the fitting.

t (second)	v (volt)
2	9.7
4	8.1
6	6.6
8	5.1
10	4.4
12	3.7
14	2.8
16	2.4
18	2
20	1.6
22	1.4
24	1.1
26	0.85
28	0.69
30	0.6



Your demonstration must:

1. Plot both the data points and the fitting curve on the same chart. Proper axis label for x- and y- axes is required. **(40%)**

2. Display the electrical potential E and time constant $\tau = RC$ of the circuit, obtained from the best fitting. **(20%)**

3. Display the error of fitting calculated. **(10%)**

4. Be able to answer the questions 1-3 when you are provided with another set of data (also consisting of 15 data points) at the time of demonstration. **(30%)**

Demonstration due November 8, 2012

Numerical Methods, Scott Zhang, October 30, 2012