

Purposes

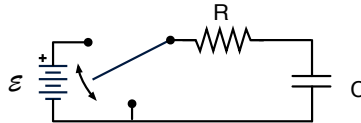
The purposes of this investigation are:

- to determine how the voltage across a charging capacitor depends on
 - the time elapsed since charging begins,
 - the amount of resistance in the “RC circuit,” and
 - (if a second capacitor is available) the amount of capacitance in the circuit.
- to determine how the voltage across a discharging capacitor depends on the time elapsed since discharging begins,

In our analysis we will determine the value of the “time constant” for one of your circuits in two different ways:

1. from its V vs t plot and
2. from the value of RC for the resistance and capacitance used for that plot.

Build an RC circuit that can be both charged and discharged. A schematic diagram is shown below. You can discharge the capacitor by connecting the resistor to the negative terminal ($V \equiv 0$ V) as seen in the diagram. Then the charging of the capacitor will begin from $t = 0$ when the resistor is connected to the positive terminal. You will measure the voltage across the capacitor as a function of time using Logger Pro software and the voltage probe. You may trigger the collection of data when the voltage begins to increase. This is already set up on the LoggerPro file provided on our web site: RCcircuitSPA.cmbl.



Design your investigation to test all three independent variables.