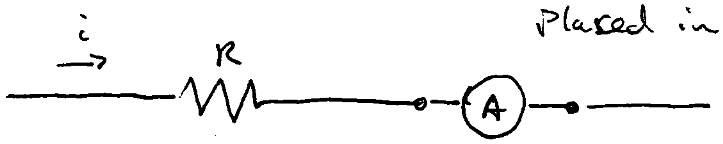
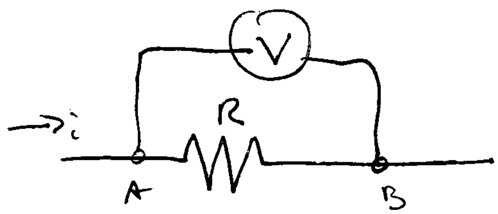
Measure currents w/ Ammeter



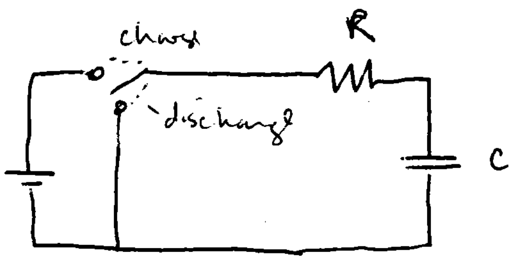
Placed in series at pt where you want to Measure current

Measure Voltage drops w/ voltmeter



Placed in parallel across The two pts where you want to measure ΔV

RC Circuits



When switch in charging position

$\Sigma V = 0 \qquad \mathcal{E} - iR - q/C = 0$

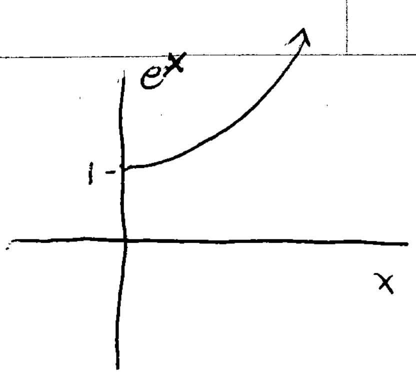
(iR ↑ V_R, q/C ↑ V_C)

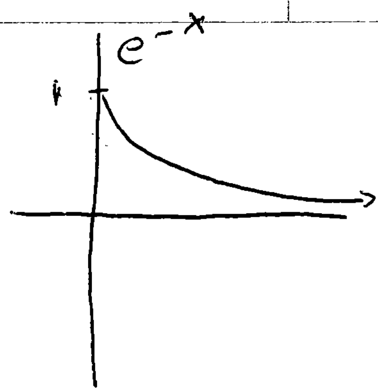
q is a function of Time

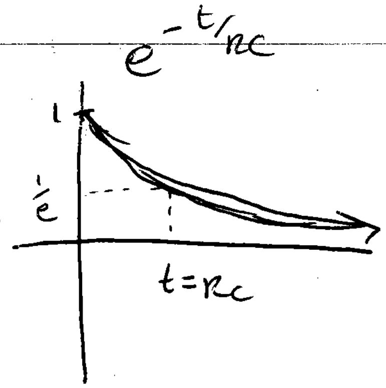
Differential Equation < $\mathcal{E} = \frac{dq}{dt} R + q/C$

↳ has soln $q = C\mathcal{E}(1 - e^{-t/RC})$

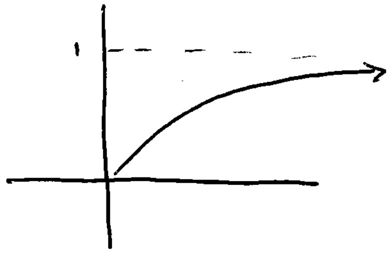
Substitute in and work out



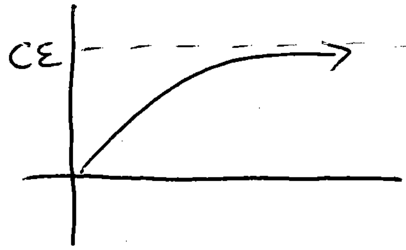




$1-e^{-t/RC}$



$q = C\mathcal{E}(1-e^{-t/RC})$



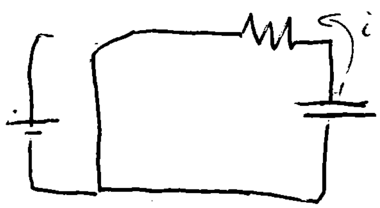
$CV = q!$

$RC \equiv$ time CONSTANT

If RC large, takes a long time to charge up capacitor
" " small, " short " "

$\tau = RC$ = Time it takes to charge up to within $\frac{1}{e}$ of final value

Now discharge



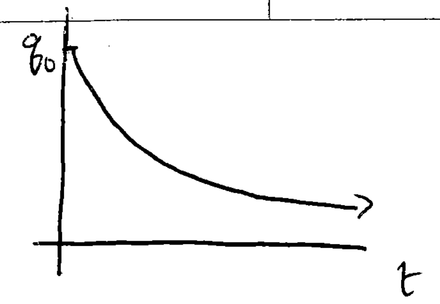
$\frac{q}{C} - iR = 0$ $\quad i = -dq/dt$

$\frac{q}{C} + \frac{dq}{dt} R = 0$

$\frac{q}{C} = -\frac{dq}{dt} R$

$\int_0^t \frac{dt}{RC} = -\int_{q_0}^{q} \frac{dq}{q}$ $\qquad -\frac{t}{RC} = \ln \frac{q}{q_0}$

$e^{-t/RC} = q/q_0$ $\qquad q = q_0 e^{-t/RC}$



again RC dictates how fast charge drains off

Know $q(t)$ can calculate $i(t)$

$V(t)$ across resistor

$V(t)$ across capacitor

Stored Energy (t) in capacitor

etc.

⋮

Magnetism - Magnetostatics

Put in a good Magnetic field Demo!

There exists a Magnetic field - can effect charged particles

$$\vec{F} = q\,\vec{V} \times \vec{B}$$

B units $\quad 1\ \text{Tesla} = 1\ \frac{N}{A \cdot M}$ $\quad$ SI

Common unit of cgs system = gauss CGS

$1\ \text{Gauss} = 10^{-4}\ \text{Tesla}$