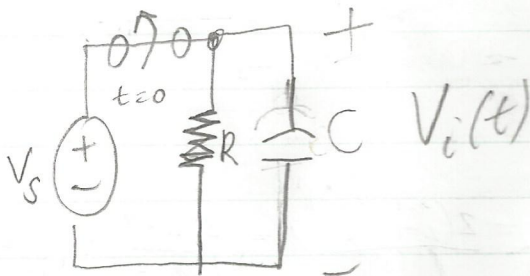


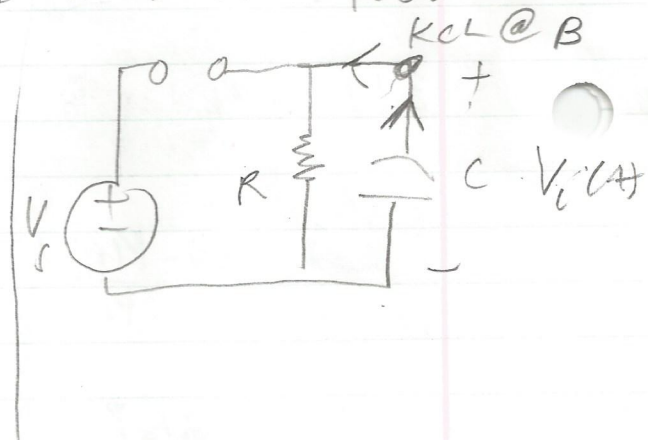
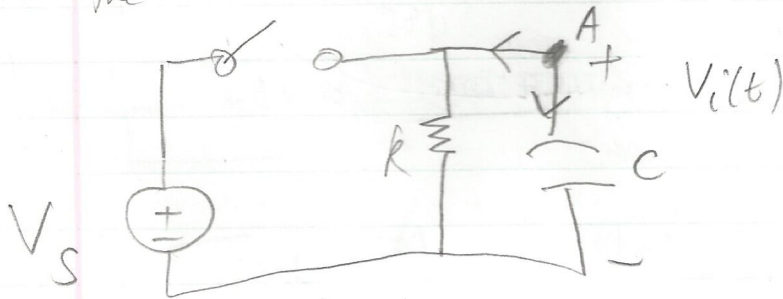
Consider the differential equation

Consider the circuit. It has been left like this since $t \rightarrow -\infty$



So at time $t=0$ the switch opens.

The new circuit is: Consider 2 cases of ^{applying} KCL



KCL @ Node A

$$\frac{V_i(t)}{R} + C \frac{dV_i(t)}{dt} = 0$$

$$\Rightarrow \frac{V_i(t)}{RC} + \frac{dV_i(t)}{dt} = 0$$

Solution: $\int \frac{dt}{RC} = \int \frac{dV_i(t)}{V_i(t)}$

$$\frac{t}{RC} + K = -\ln(V_i(t))$$

$$\Rightarrow K e^{-\frac{t}{RC}} = V_i(t)$$

KCL @ node B

$$\frac{V_i(t)}{R} - C \frac{dV_i(t)}{dt} = 0$$

$$-\frac{V_i(t)}{RC} + \frac{dV_i(t)}{dt} = 0$$

Solution $\Rightarrow \int \frac{dV_i(t)}{V_i(t)} = \int \frac{dt}{RC}$

$$\ln(V_i(t)) = \frac{t}{RC} + K$$

$$\Rightarrow V_i(t) = K_1 e^{\frac{t}{RC}}$$