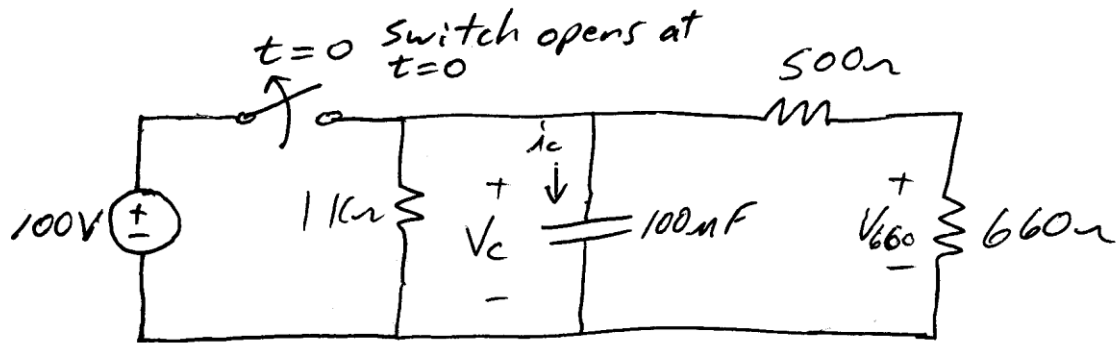


ex. Source Free RC circuit



Find V_c , V_{660} , + i_c for $t > 0$

$$V_c(0) = V_0 = \underline{100V} \quad \leftarrow \text{voltage source was in parallel for } t < 0$$

$$R = R_{eq} = 1k\Omega // (500 + 660) = 1000 // 1160$$

$$\underline{R = 537\Omega}$$

$$\tau = RC = 537(100 \times 10^{-6}) = \underline{0.0537s}$$

voltage divider \rightarrow

$$V_c(t) = V_0 e^{-t/\tau} = \underline{100 e^{-t/0.0537} V} = \underline{100 e^{-18.621t} V} \quad t > 0$$

$$V_{660}(t) = \frac{660}{500+660} V_c(t) = \underline{56.90 e^{-t/0.0537} V} \quad t > 0$$

$$i_c(t) = C \frac{dV_c}{dt} = 100 \times 10^{-6} \frac{d(100 e^{-t/0.0537})}{dt}$$

$$= (100 \times 10^{-6}) \left(\frac{-1}{0.0537} \right) 100 e^{-t/0.0537}$$

$$= -\frac{1}{537} (100) e^{-t/0.0537}$$

$$\underline{i_c(t) = -0.1862 e^{-t/0.0537} A} \quad t > 0$$

OR

$$i_c(t) = \frac{-V_c(t)}{R_{eq}} = \frac{-100 e^{-t/0.0537}}{537} = \underline{-0.1862 e^{-t/0.0537} A} \quad t > 0$$