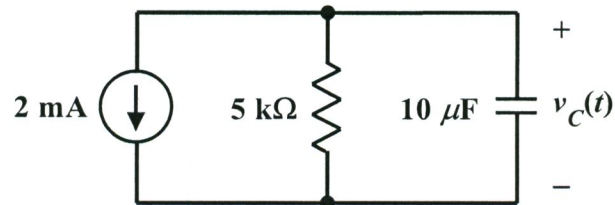


EE 2240
Problem #05

Given $v_C(0) = 10$ V, determine $v_C(\infty)$ and $v_C(t)$ for $t \geq 0$.



$$v_C(\infty) = -(2\text{mA})(5\text{k}\Omega) = -10\text{V}, \quad \tau = (5\text{k}\Omega)(10\mu\text{F}) = 50\text{ms}$$

$$\begin{aligned} v_C(t) &= [v_C(0) - v_C(\infty)] e^{-t/\tau} + v_C(\infty) \\ &= [10 - (-10)] e^{-t/0.05} + (-10) \\ &= 20 e^{-20t} - 10 \quad \text{V}, \quad t \geq 0 \end{aligned}$$