

Electrical Circuits- HW Problems

In problems 1 and 2 assume we have an RL circuit (ie there is no capacitor) where at time $t = 0$, $I(0) = 0$. Assume that $L = 5H$ and $R = 20ohms$.

1. If $E(t) = 60$ find $I(t)$. Find $\lim_{t \rightarrow \infty} I(t)$.

2. If $E(t) = 60 \sin(30t)$ find $I(t)$.

3. Assume we have an RC circuit (ie, $L = 0$) where the resistance is $R = 10ohms$ and the capacitance is $C = 0.01Farads$. Suppose the charge at time $t = 0$ is $Q(0) = 10Coulombs$ and $E(t) = 50\sin(20t)$. Find $Q(t)$ and the current $I(t)$.

In problems 4 and 5 we have an RLC circuit where $R, L, C, E(t), I(0)$, and $Q(0)$ are given. Find $I(t)$.

4. $L = 2H$, $R = 12ohms$, $C = 0.02F$, $E(t) = 100V$, $I(0) = 0$,
 $Q(0) = 4$

5. $L = 2H$, $R = 22ohms$, $C = \frac{1}{60}F$, $E(t) = 10e^{-t}$, $I(0) = 0$,
 $Q(0) = 0$.