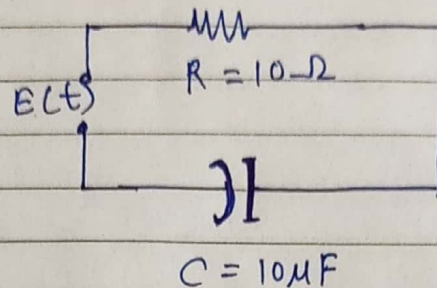


Q 5) For the circuit, eqⁿ is

$$R \frac{dq}{dt} + \frac{1}{C} q = E(t)$$

simulate this eqⁿ for 10 seconds for 5 different initial condition and input $E(t)$?



Ans: Given:

$$R \frac{dq}{dt} + \frac{1}{C} q = E(t)$$

$$R = 10 \Omega \quad \& \quad C = 10 \mu F.$$

but we know,

$$i(t) = \frac{dq}{dt} \quad \text{and} \quad q = \int i(t) dt.$$

$$V(t) = V(t) = R(i)(t) + \frac{1}{C} \int i(t) \cdot dt. \quad \text{--- ①}$$

$$\therefore V_o(t) = \frac{1}{C} \int i(t) \cdot dt \quad \text{--- ②}$$

$$\therefore \text{Transfer fun} = \frac{V_o(s)}{V_i(s)} = \frac{\frac{1}{sC} I(s)}{(R + \frac{1}{sC}) I(s)}$$

$$\therefore \frac{V_o(s)}{V_i(s)} = \frac{1}{sRC + 1}$$

by putting given value,

$$H(s) = \frac{1}{100 \mu F \cdot s + 1}$$