Tarefa 3 - Cálculo 1 790753 NO. 1 DATE 21 . 10 . 20

1) $\frac{di}{dt} + \frac{R}{L} i = \frac{V}{L}$, se $i(t) = \frac{V}{R}$

$i'(t) = 0$

$0 + \frac{R}{L} \cdot \frac{V}{R} = \frac{V}{L}$

$0 = 0$

2) $i(t) = \frac{V}{R} + c\, t^n$, $i'(t) = c \cdot n \cdot t^{n-1}$

$c \cdot n \cdot t^{n-1} + \frac{R}{L}\left[\frac{V}{R} + c \cdot t^n\right] = \frac{V}{L}$

$c \cdot n\, t^{n-1} + \frac{V}{L} + \frac{R}{L} \cdot c \cdot t^n = \frac{V}{L}$

$c \cdot n \cdot t^{n-1} = -\frac{R}{L} \cdot c \cdot t^n$

$\frac{n}{t} = -\frac{R}{L}$, o que não faz sentido, pois R, L e n são constantes enquanto t é variável.

3) $i(t) = \frac{V}{R} + f(t)$, $i'(t) = f'(t)$

$i'(t) = -\frac{R \cdot f(t)}{L}$

$\frac{f'(t)}{f(t)} = -\frac{R}{L}$

$f'(t) = -R \cdot \frac{f(t)}{L}$

$-\frac{R}{L} f(t) + \frac{R}{L}\left[\frac{V}{R} + f(t)\right] = \frac{V}{L}$

$-\frac{R}{L} \cdot f(t) + \frac{V}{L} + \frac{R}{L} f(t) = \frac{V}{L}$

$0 = 0$

4) $f(t) = c \cdot e^{k \cdot t}$

$f'(t) = c \cdot k \, e^{k \cdot t}$

$$\frac{f'(t)}{f(t)} = \frac{c \cdot k \cdot e^{kt}}{c \cdot e^{kt}} = k$$

5) $i(t) = \frac{V}{R} + c \cdot e^{-R/L \, t}$

$i'(t) = -c \cdot \frac{R}{L} \cdot e^{-R/L \cdot t}$

$$-c \cdot \frac{R}{L} \cdot e^{-R/L \cdot t} + \frac{R}{L}\left[\frac{V}{R} + c \cdot e^{-R/L \, t}\right] = \frac{V}{L}$$

$$-c \cdot \frac{R}{L} e^{-R/L \, t} + \frac{V}{L} + \frac{R}{L} c \cdot e^{-R/L \, t} = \frac{V}{L}$$

$0 = 0$

6) $i(t) = \frac{V}{R} + c \cdot e^{-R/L \cdot t}$

$0 = \frac{V}{R} + c \, e^{-R/L \cdot 0}$

$c = -\frac{V}{R}$

7) $i(t) = \frac{V}{R} + c \cdot e^{-R/L \cdot t}$

$$\lim_{t \to \infty} i(t) = \lim_{t \to \infty} \frac{V}{R} + \frac{c}{e^{+R/L \, t}} = \frac{V}{R}$$

8) $i(t) = \frac{V}{R} - \frac{V}{R} e^{-R/L \cdot t}$

$\frac{V}{2R} = \frac{V}{R} - \frac{V}{R} \cdot e^{-R/L \cdot t}$

$\frac{1}{2} = e^{-R/L \cdot t}$

$\ln(1/2) = -R/L \cdot t$

$t = \frac{-L}{R} \ln(1/2)$

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