

Respostas dos Exercícios - Lista XII

Física III

1º Semestre de 2016

1. a) $\frac{d^2 I}{dt^2} = -\frac{I}{LC}$; b) $\alpha = \pm \frac{1}{\sqrt{LC}}$
- e) $C = 2|A| = 2\sqrt{a_R^2 + a_i^2}$; $\Phi = \arctg\left(\frac{a_i}{a_R}\right)$; $D = 2a_R$; $E = -2a_i$
- f) Se $I(t) = D \cos(\alpha t + \phi)$, então $Q(t) = LC \alpha D \sin(\alpha t + \phi)$
- g) $m \rightarrow L$; $1/k \rightarrow C$; $x \rightarrow Q$; $\dot{x} \rightarrow I$
2. a) $I(t) = -18750 \sin(1250 t + \pi/4)$ b) $C = 2,8 \times 10^{-2}$ F
- c) $U_e \approx 5 \times 10^6 \cos^2(1250 t + \pi/4)$; $U_m \approx 5 \times 10^6 \sin^2(1250 t + \pi/4)$
3. a) $\frac{d^2 I}{dt^2} + \gamma \frac{dI}{dt} + \omega_o^2 I = 0$
- b) Subcrítico: $\omega_o^2 > \frac{\gamma^2}{4}$; Crítico: $\omega_o^2 = \frac{\gamma^2}{4}$; Super-crítico: $\omega_o^2 < \frac{\gamma^2}{4}$
- c) $I(t = 2 \times 10^{-4} \text{ s}) \approx -7,3 \times 10^{-2}$ A
4. a) $Z = 3322 \Omega$ b) $I_e = 3,3 \times 10^{-2}$ A
- c) $P(t) = 4,4 \cos^2(377 t + 0,93)$; $\langle P \rangle = 2,2$ W ; d) $V_R \approx 66$ V ; $V_c \approx 88$ V
5. a) (i) $\omega_C = \sqrt{\frac{1}{LC} - \frac{R^2}{2L^2}}$ (ii) $\omega_L = \frac{1}{\sqrt{LC - R^2 C^2/2}}$ b) $C \approx 36 \mu\text{F}$