Física 3 – Engenharia de Telecomunicações - Formulário 3

Aluno:

$|e| = 1{,}6 \cdot 10^{-19}\,C \quad \varepsilon_0 = 8{,}85 \cdot 10^{-12}\,C^2/Nm^2 \quad \mu_0 = 4\pi \cdot 10^{-7} \quad c_{luz} = 3 \times 10^8\,m/s \quad h = 6{,}63 \times 10^{-34}\,m^{2\,kg}/s \quad \vec{F}_r = \vec{F}_1 + \vec{F}_2 + \ldots$

$\epsilon = K \cdot \epsilon_0 \quad V = R \cdot I \quad i = \frac{V}{R} \quad R = \frac{V}{i} \quad Pot = V \cdot i \quad V = \frac{Pot}{i} \quad i = \frac{Pot}{V} \quad R = \frac{V^2}{Pot} \quad E = c \cdot B \quad E = V_{luz} \cdot B \quad I = \frac{dq}{dt}$

$Vel = \frac{dx}{dt} \quad V_{esfera} = \frac{4\pi R^3}{3} \quad V_{cilindro} = \pi R^2 L \quad A_{esfera} = 4\pi R^2 \quad A_{lateralCilindro} = 2\pi R L \quad A_{circulo} = \pi R^2 \quad \varepsilon = -A \cdot \frac{d\Phi_B}{dt}$

$\Phi_B = \int \vec{B} \cdot d\vec{A} = B \cdot A \cdot \cos(\theta) \quad \varepsilon = -\frac{d\Phi_B}{dt} = \frac{d(B \cdot A \cdot \cos(\theta))}{dt} \quad Pot = \frac{\varepsilon^2}{R} \quad \varepsilon = B \cdot x_{constante} \cdot Vel \quad J = \frac{dI}{dA}$

Indutância: $\varepsilon_2 = -N_2 \frac{d\Phi_{B_2}}{dt} \quad N_2 \Phi_{B_2} = M_{21} i_1 \quad N_2 \frac{d\Phi_{B_2}}{dt} = M_{21} \frac{di_1}{dt} \quad \varepsilon_2 = -M_{21} \frac{di_1}{dt} \quad M_{21} = \frac{N_2 \Phi_{B_2}}{i_1}$

Transformador: $\frac{N_2}{N_1} = \frac{V_2}{V_1} = \frac{I_1}{I_2} \quad V_2 \varepsilon_2 = N_2 \cdot \frac{d\Phi}{dt} \quad V_1 \varepsilon_1 = N_1 \cdot \frac{d\Phi}{dt} \quad \frac{R_2}{R_1} = \frac{N_2^2}{N_1^2}$

Gradiente: $\vec{\nabla} = \frac{\partial}{\partial x}\hat{i} + \frac{\partial}{\partial y}\hat{j} + \frac{\partial}{\partial z}\hat{k} \quad \vec{E} = \vec{\nabla} V$

Divergente: $\vec{\nabla} \cdot \vec{F} = div(\vec{F}) \quad \vec{V} \cdot \vec{U} = V_x U_x + V_y U_y + V_z U_z \quad \vec{\nabla} \cdot \vec{F} = \frac{\partial F_x}{\partial x} + \frac{\partial F_y}{\partial y} + \frac{\partial F_z}{\partial z} \quad \vec{\nabla} \cdot \vec{E} = \frac{\rho_e}{\epsilon_0} \quad \vec{\nabla} \cdot \vec{B} = 0$

Rotacional: $\vec{\nabla} x \vec{F} = rot(\vec{F}) \quad \vec{\nabla} x \vec{F} = \left(\frac{\partial F_z}{\partial y} - \frac{\partial F_y}{\partial z}\right)\hat{i} + \left(\frac{\partial F_x}{\partial z} - \frac{\partial F_z}{\partial x}\right)\hat{j} + \left(\frac{\partial F_y}{\partial x} - \frac{\partial F_x}{\partial y}\right)\hat{k}$

Ondas: $\frac{\partial y}{\partial x} = kA\cos(kx - \omega t) \quad \frac{\partial^2 y}{\partial x^2} = -k^2 A\cos(kx - \omega t) = -k^2 y \quad \frac{\partial y}{\partial t} = -\omega A\cos(kx - \omega t)$

$\frac{\partial^2 y}{\partial t^2} = -\omega^2 A\,sen(kx - \omega t) = -\omega^2 y \quad y = A \cdot sen(kx - \omega t) \quad y = A \cdot \cos(kx - \omega t) \quad k = \frac{2\pi}{\lambda}$

$\lambda = \frac{2\pi}{k} \quad T = \frac{1}{f} \quad \omega = 2\pi f \quad k^2 = \frac{\omega^2}{V^2} \quad \epsilon_0 \mu_0 = \frac{1}{V^2} \quad V = \sqrt{\frac{1}{\epsilon_0 \mu_0}} \quad E = V \cdot B \quad B = \frac{E}{V} \quad V = \lambda \cdot f \quad \lambda = \frac{V}{f} \quad \lambda = \frac{V}{\frac{\omega}{2\pi}}$

$V = \frac{\omega}{k} \quad f = \frac{c}{\lambda} \quad c = \lambda \cdot f \quad \lambda = \frac{c}{f} \quad u = \epsilon_0 E^2 \quad f = \frac{c \cdot k}{2\pi} \quad Pressão = \frac{F}{A}$

Vetor de Poyinting: $\frac{1}{A}\frac{dU}{dt} = \frac{E \cdot B}{\mu_0} \quad \vec{S} = \left(\frac{1}{A}\frac{\vec{dU}}{dt}\right) = \frac{\vec{E} x \vec{B}}{\mu_0} \quad S = \frac{c \cdot B^2}{\mu_0} \quad B_{méd}^2 = \frac{B_{máx}^2}{2} \quad S_{méd} = \frac{c}{\mu_0} \cdot \frac{B_{máx}^2}{2} \quad S_{méd} = \frac{E_{máx} \cdot B_{máx}}{2\mu_0}$

$\vec{P} = m \cdot \vec{v} \quad I = S_{méd} \quad \mu = K_m \cdot \mu_0 \quad V = \frac{1}{\sqrt{\mu \cdot E}} \quad E = c \cdot B \quad E = k \cdot \epsilon_0 \quad I = \frac{Pot}{A} \quad Pot = I \cdot A \quad Pot = (P_{rad} \cdot c) \cdot A$

$I = \frac{Pot}{4\pi r^2} \quad P_{luz} = \frac{E}{C} \quad E = h \cdot f \quad P_{rad.LTA} = \frac{S_{méd}}{c} = \frac{I}{c} \quad P_{rad.LTR} = \frac{2 \cdot I}{c} \quad \omega = c \cdot k$

Significados: P: momento linear, h: constante de Planck, LTA: luz totalmente absorvida, LTR: luz totalmente refletida, ε: força eletromotriz induzida ou dpp ou tensão, Pot: potência, Vel: velocidade

Unidades: Φ_B = [Tm^2] = [Weber], I = [A] = [c/s], J = [A/m^2], S = [J/m^2s], ω = [rad/s], f = Hz, Pot = [W], ε = [V]