

Física 3 – Engenharia de Telecomunicações - Formulário 1

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$$|e| = 1,6 \cdot 10^{-19} \text{ C} \quad Q = n \cdot e \quad (Q_{\text{total}})_{\text{antes}} = (Q_{\text{total}})_{\text{depois}} \quad |\vec{F}| = \frac{k \cdot |Q_1| \cdot |Q_2|}{r^2} \quad E_p = \frac{k \cdot Q_1 \cdot Q_2}{r^2}$$

$$U_{\text{total}} = U_{12} \pm U_{12} \pm U_{21} \pm \dots \quad \vec{F}_r = \vec{F}_1 + \vec{F}_2 + \dots \quad k = \frac{1}{4 \pi \epsilon_0} \quad K_0 = 9 \cdot 10^9 \text{ Nm}^2/\text{C}^2 \quad \epsilon_0 = 8,85 \cdot 10^{-12} \text{ C}^2/\text{Nm}^2$$

$$\vec{F} = q \cdot \vec{E} \quad |\vec{E}| = \frac{k \cdot Q}{r^2} \quad \vec{E}_r = \vec{E}_1 + \vec{E}_2 + \dots \quad \vec{F}_r = m \cdot \vec{a} \quad a = \frac{\Delta v}{\Delta t} \quad V = V_0 + a \cdot t \quad V^2 = V_0^2 + 2 \cdot a \cdot \Delta x$$

$$X = X_0 + V_0 t + \frac{at^2}{2} \quad v = \frac{\Delta x}{\Delta t} \quad \lambda = \frac{Q}{L} \quad \sigma = \frac{Q}{A} \quad \rho = \frac{Q}{V} \quad V_{\text{esfera}} = \frac{4 \pi R^3}{3} \quad A_{\text{esfera}} = 4 \pi R^2$$

$$V_{\text{cilindro}} = \pi R^2 L \quad A_{\text{lateralCilindro}} = 2 \pi R L \quad A_{\text{circulo}} = \pi R^2 \quad E = \frac{k \cdot Q}{d^2 - \frac{L^2}{4}} \quad E = \frac{2k\lambda}{r} \quad E = \frac{k \cdot Q \cdot x}{(x^2 + R^2)^{\frac{3}{2}}}$$

$$E_y = -\frac{k \cdot \lambda}{R} (\cos(\theta_1) - \cos(\theta_2)) \quad E_y = \frac{k \cdot Q}{L \cdot y} (\text{sen}(\theta_2) - \text{sen}(\theta_1)) \quad E = 2 \pi k \sigma \left(1 - \frac{1}{\sqrt{1 + \frac{R^2}{x^2}}} \right)$$

$$E_x = -\frac{k \cdot \lambda}{R} (\text{sen}(\theta_2) - \text{sen}(\theta_1)) \quad E_x = -\frac{k \cdot Q}{L \cdot y} (\cos(\theta_1) - \cos(\theta_2))$$

$$E = 2 \pi k \sigma \left(\frac{1}{\sqrt{1 + \left(\frac{R_1}{x}\right)^2}} - \frac{1}{\sqrt{1 + \left(\frac{R_2}{x}\right)^2}} \right) \quad \phi_E = \int_s \vec{E} \cdot d\vec{A} \quad \phi_E = E \cdot A \cdot \cos(\theta) \quad E = 2 \pi k \sigma \quad E = 4 \pi k \sigma$$

$$\Delta E = 4 \pi k \sigma \quad E_{\text{prox}} = 4 \pi k \sigma \quad \phi_E = \vec{E} \cdot \vec{A} \quad \oint \vec{E} \cdot d\vec{A} = \frac{q_{\text{int}}}{\epsilon_0}$$

$$\vec{E} \cdot d\vec{A} = E \cdot dA \cdot \cos(\theta) \quad \vec{E} \cdot d\vec{A} = E_x dA_x + E_y dA_y + E_z dA_z \quad V = \frac{k \cdot Q}{r} \quad W_{\text{el}} = -\Delta E_{\text{pe}} = -(E_{\text{pf}} - E_{\text{pi}})$$

$$E = \frac{2kp}{x^3} \cdot \left(\frac{1}{\left(1 - \left(\frac{d}{2x}\right)^2\right)^{\frac{3}{2}}} \right) \quad p = g \cdot d \quad E_{\text{pe}} = q \cdot V \quad W_{\text{ef}} = -q \cdot \Delta V \quad \Delta V = V_f - V_i \quad V_{\text{total}} = V_1 + V_2 + V_3 + \dots$$

$$E \approx \frac{2kp}{x^3} \quad E \approx \frac{kp}{y^3} \quad E = \frac{k \cdot p}{\left(\frac{d^2}{4} + y^2\right)^{\frac{3}{2}}} \quad V \approx \frac{k \cdot p \cdot \cos(\theta)}{r^2} \quad \vec{\tau} = \vec{p} \times \vec{E}$$

$$|\vec{\tau}| = p \cdot E \text{sen}(\theta)$$

$$E_{\text{pe}} = -\vec{p} \cdot \vec{E} \quad E_{\text{pe}} = -p \cdot E \cdot \cos(\theta) \quad \Delta V = -\int \vec{E} \cdot d\vec{x} \quad \Delta V = -\int \vec{E} \cdot d\vec{r}$$

$$\vec{E} = -\frac{dv}{dx} \hat{i} \quad \vec{E} = -\frac{dv}{dr} \hat{r} \quad \vec{E} = -\left(\frac{dv}{dx} \hat{i} + \frac{dv}{dy} \hat{j} + \frac{dv}{dz} \hat{k} \right) = -\vec{\nabla} v \quad \Delta v = -E \cdot \Delta x$$

$$\Delta V = -\left[\int E_x dx + \int E_y dy + \int E_z dz \right]$$

$$V = -\frac{k \cdot Q}{L} \cdot \ln \left(\frac{x - \frac{L}{2}}{x + \frac{L}{2}} \right) \quad V = 2 \cdot k \cdot \lambda \cdot \ln \left(\frac{r_{\text{ref}}}{r} \right) \quad v = k \cdot \lambda \cdot \ln \left(\frac{\sec(\theta_2) + \text{tg}(\theta_2)}{\sec(\theta_1) + \text{tg}(\theta_1)} \right) \quad V = k \cdot \lambda \cdot (\theta_2 - \theta_1)$$

$$V = \frac{k \cdot \lambda R \cdot \alpha}{\sqrt{x^2 + R^2}} \quad V = \frac{k \cdot Q}{\sqrt{x^2 + R^2}} \quad V = 2k\pi\sigma \cdot (\sqrt{x^2 + R_2^2} - \sqrt{x^2 + R_1^2}) \quad V = \frac{2kQ}{R^2} \cdot (\sqrt{x^2 + R^2} - x)$$

$$\text{tg}(\theta) = \frac{\text{sen}(\theta)}{\text{cos}(\theta)} \quad \text{cos}(\theta) = \frac{\text{C.A.}}{\text{hipotenusa}} \quad \text{sen}(\theta) = \frac{\text{C.O.}}{\text{hipotenusa}}$$

$$\text{cotg}(\theta) = \frac{1}{\text{tg}(\theta)} \quad \text{sec}(\theta) = \frac{1}{\text{cos}(\theta)} \quad \text{cossec}(\theta) = \frac{1}{\text{sen}(\theta)}$$

$$E = \frac{\rho \cdot r}{3\epsilon_0} \quad E = \frac{\rho \cdot r}{2\epsilon_0} \quad V = \frac{\rho}{2\epsilon_0} \left[\frac{R^2 - r^2}{2} + R^2 \cdot \ln \left(\frac{r_{\text{ref}}}{R} \right) \right] \quad E = \frac{\rho}{3\epsilon_0} \cdot \frac{(r^3 - R_1^3)}{r^2} \quad V = \frac{\rho}{3\epsilon_0} \cdot \left(\frac{R^2 - r^2}{2} \right) + \frac{k \cdot Q}{R}$$

$$E = \frac{\rho}{2\epsilon_0} \cdot \frac{(r^2 - R_1^2)}{r} \quad V = \frac{\rho}{3\epsilon_0} \cdot \left[\frac{1}{2} \cdot (R_2^2 - r^2) - R_1^3 \cdot \left(\frac{1}{r} - \frac{1}{R_2} \right) + \frac{1}{R_2} \cdot (R_2^3 - R_1^3) \right]$$

$$V = \frac{\rho}{2\epsilon_0} \cdot \left[\frac{(R_2^2 - r^2)}{2} - R_1^2 \ln \left(\frac{R_2}{r} \right) + (R_2^2 - R_1^2) \cdot \ln \left(\frac{r_{\text{ref}}}{R_2} \right) \right]$$