Física 3 – Engenharia de Telecomunicações - Formulário 1

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$$|e|=1,6.10^{-19}\,C \qquad Q=n.e \qquad (Q_{total})_{antes}=(Q_{total})_{depois} \qquad |\vec{F}|=\frac{k.|Q_1|.|Q_2|}{r^2} \qquad E_p=\frac{k.Q_1.Q_2}{r^2}$$

$$U_{total}=U_{12}\pm U_{12}\pm U_{21}\pm ... \qquad \vec{F}_r=\vec{F}_1+\vec{F}_2+... \qquad k=\frac{1}{4\pi\epsilon_0} \qquad K_0=9.10^9\,Nm^2/C^2 \qquad \epsilon_0=8,85.10^{-12}\,C^2/Nm^2$$

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

$$X=X_0+V_0t+\frac{at^2}{2} \qquad v=\frac{\Delta x}{\Delta t} \qquad \lambda=\frac{Q}{L} \qquad \sigma=\frac{Q}{A} \qquad \rho=\frac{Q}{V} \qquad V_{esfera}=\frac{4}{3}\pi R^2 \qquad A_{esfera}=4\pi R^2$$

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

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

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

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

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

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

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

$$E\approx\frac{2kp}{x^3} \qquad E\approx\frac{kp}{y^3} \qquad E=\frac{k.p}{\left(\frac{d^2}{4}+y^2\right)^{\frac{3}{2}}} \qquad V\approx\frac{k.p.\cos(\theta)}{r^2} \qquad \vec{\delta}=\vec{p}\,x\,\vec{E}$$

$$|\vec{\delta}|=p.E\,sen(\theta)$$

$$E_{pe}=-\vec{p}.\vec{E} \qquad E_{pe}=-p.E.\cos(\theta) \qquad \Delta V=-\int \vec{E}.d\vec{x} \qquad \Delta V=-\int \vec{E}.d\vec{r} \qquad \Delta V=-\left[\int E_x dx+\int E_y dy+\int E_z dz\right]$$

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

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

$$V = \frac{k.\lambda R.\alpha}{\sqrt{x^2+R^2}} \qquad V = \frac{k.Q}{\sqrt{x^2+R^2}} \qquad V = 2k\,\pi\,\sigma.\left(\sqrt{x^2+R_2^2}-\sqrt{x^2+R_1^2}\right) \qquad V = \frac{2kQ}{R^2}.\left(\sqrt{x^2+R^2}-x\right)$$

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

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

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

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

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