ΠΕΔΙΑ Α 28/06/2010

$\Theta\epsilon\mu\alpha$ 1

(α)

$$\vec{E} = \begin{cases} \left[\frac{\rho_0}{2\epsilon_0}x_0 + \frac{\lambda_0}{2\pi\epsilon_0}(x-x_0)\right]\ \hat{i}_x + \left[\frac{\rho_0}{2\epsilon_0}y_0 + \frac{\lambda_0}{2\pi\epsilon_0}(y-y_0)\right]\ \hat{i}_y & \text{for } r_{T1} < \mathrm{a}, \\ & \text{and } r_{T2} < b, \\ \left[\frac{\rho_0}{2\epsilon_0}x + \frac{\lambda_0 - b^2\pi\rho_0}{2\pi\epsilon_0}\frac{x-x_0}{(x-x_0)^2+(y-y_0)^2}\right]\ \hat{i}_x + \left[\frac{\rho_0}{2\epsilon_0}y + \frac{\lambda_0 - b^2\pi\rho_0}{2\pi\epsilon_0}\frac{y-y_0}{(x-x_0)^2+(y-y_0)^2}\right]\ \hat{i}_y & \text{for } r_{T1} < \mathrm{a}, \\ & \text{and } r_{T2} > b, \\ \left[\frac{\rho_0}{2\epsilon_0}\frac{x}{x^2+y^2} + \frac{\lambda_0 - b^2\pi\rho_0}{2\pi\epsilon_0}\frac{x-x_0}{(x-x_0)^2+(y-y_0)^2}\right]\ \hat{i}_x + \left[\frac{\rho_0}{2\epsilon_0}\frac{y}{x^2+y^2} + \frac{\lambda_0 - b^2\pi\rho_0}{2\pi\epsilon_0}\frac{y-y_0}{(x-x_0)^2+(y-y_0)^2}\right]\ \hat{i}_y & \text{for } r_{T1} > \mathrm{a}, \\ r_{T1} = [x^2+y^2]^{1/2} \quad r_{T2} = [(x-x_0)^2 + (y-y_0)^2]^{1/2}. \end{cases}$$

(β)

$$\frac{k-1}{k} = \frac{b^2\rho\pi - \lambda_0}{\mathrm{a}^2\pi\rho_0}$$

(γ)

$$\vec{f} = \frac{\lambda_0\rho_0}{2\epsilon_0}[x\ \hat{i}_x + y\ \hat{i}_y]$$

$\Theta\epsilon\mu\alpha$ 2

(α)

$$\vec{H} = \begin{cases} \left[-\frac{I_1}{2\pi}\frac{y}{x^2+y^2} + \frac{K_2}{2}\right]\ \hat{i}_x + \left[\frac{I_1}{2\pi}\frac{x}{x^2+y^2}\right]\ \hat{i}_y & \text{for } z > -y\tan\theta, \\ \left[-\frac{I_1}{2\pi}\frac{y}{x^2+y^2} - \frac{K_2}{2}\right]\ \hat{i}_x + \left[\frac{I_1}{2\pi}\frac{x}{x^2+y^2}\right]\ \hat{i}_y & \text{for } z < -y\tan\theta. \end{cases}$$

(β)

$$\vec{f} = \frac{I_1}{2\pi}\mu_0\Big[K_2\sin\theta\frac{x}{x^2+y^2}\ \hat{i}_x - K_2\sin\theta\frac{y}{x^2+y^2}\ \hat{i}_y + K_2\cos\theta\frac{y}{x^2+y^2}\ \hat{i}_z\Big]_{z=-y\tan\theta}$$

(γ)

$$\vec{f} = \begin{cases} \frac{\mu_0 I_1 K_2}{2}\ \hat{i}_y & \text{for } z > 0, \\ \frac{\mu_0 I_1 K_2}{2}\ \hat{i}_y & \text{for } z < 0. \end{cases}$$

(δ)

Cylinder

$$x^2 + \Big(y - \frac{I_1}{2\pi K_2}\Big)^2 = \Big(\frac{I_1}{2\pi K_2}\Big)^2 \qquad \text{and} \quad z > -y\tan\theta$$

Cylinder

$$x^2+\Big(y+\frac{I_1}{2\pi K_2}\Big)^2=\Big(\frac{I_1}{2\pi K_2}\Big)^2 \qquad \text{and} \quad z<-y\tan\theta$$

<u>$\Theta\epsilon\mu\alpha$ 3</u>

(α)

$$\beta=\omega\sqrt{\epsilon_0\mu_0}, \qquad \text{Righthanded Elliptical Polarization}$$

(β)

$$\begin{aligned}\vec{E}_r &= E_0[-2\ \hat{i}_x+j\ \hat{i}_y]\exp[+j\beta z]\\ &\quad \text{Lefthanded Elliptical Polarization}\\ \vec{H}_r &= \frac{E_0}{Z_0}[j\ \hat{i}_x+2\ \hat{i}_y]\exp[+j\beta z]\end{aligned}$$

(γ)

$$\vec{\mathcal{E}}(z,t)=E_0\sin(\beta z)[4\sin(\omega t)\ \hat{i}_x-2\cos(\omega t)\ \hat{i}_y]$$

(δ)

$$\begin{aligned}\sigma(t) &= 0,\\ \vec{\mathcal{K}}(t) &= \frac{2E_0}{Z_0}\Big[2\cos(\omega t)\ \hat{i}_x+\sin(\omega t)\ \hat{i}_y\Big].\end{aligned}$$

(ϵ)

$$\begin{aligned}\vec{f} &= \frac{\mu_0}{2}\Big(\frac{2E_0}{Z_0}\Big)^2[\cos^2(\omega t)+1]\ \hat{i}_z\\ \langle\vec{f}\rangle &= \frac{3\mu_0}{4}\Big(\frac{2E_0}{Z_0}\Big)^2\ \hat{i}_z\end{aligned}$$