$-j\beta_1 h_y^1 = k_0 \epsilon_x e_x^1$

$-j\beta_2 h_y^2 = k_0 \epsilon_x e_x^2$

$3 = \dfrac{\frac{1}{2}\beta}{1}$

μ

β

$-j[\beta_1, \beta_2, \beta]\, h_y = k_0 \epsilon_y e_x$

$\nabla \times h = k_0 \epsilon e$

$\nabla \times e = k_0 \mu h$

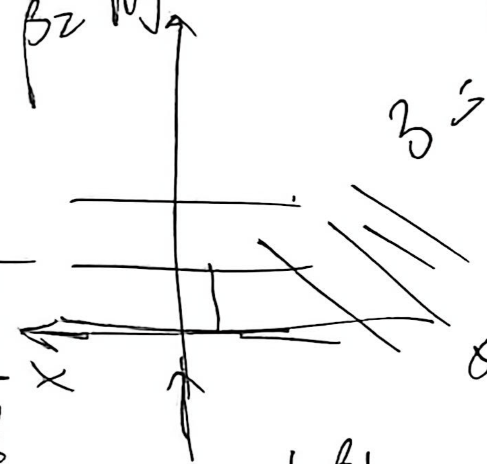
$= \epsilon_x \quad \epsilon_x^{-1}$

$e_x = -j\beta k_0^{-1} \epsilon_x^{-1}$

$-j\beta h_y = k_0 \epsilon_x e_x$

$\dfrac{\partial h_y}{\partial x} = k_0 \epsilon_z e_z$

$j\beta e_x - \dfrac{\partial e_z}{\partial x} = k_0 \mu_y h_y$



$\epsilon_{eo} \times \dfrac{100}{50\%} = \dfrac{1}{2}\beta$

$\beta + 1$

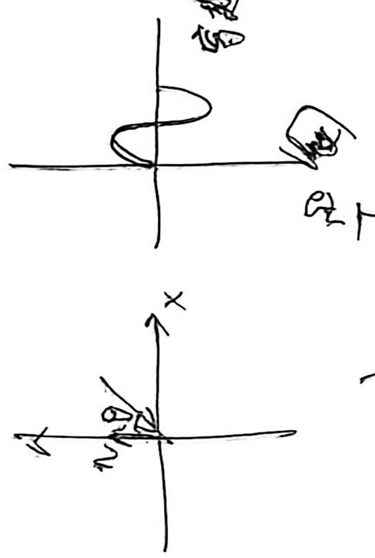
$h = j$

$h = -j\sqrt{\dfrac{\mu_0}{\epsilon_0}}$

$h_y \quad -j\beta(\beta^1$

$e_z \quad e_x \quad x$

$-j\begin{pmatrix}\beta_1 \\ \beta_2\end{pmatrix}(h_y^1, h_y^2) = k_0 \epsilon_x (e_x^1, e_x^2)$



$\vec{k} = [k_x, k_y, k_z]$

$j\beta\left(-j\beta k_0^{-1} \epsilon_x^{-1} h_y\right) - \dfrac{\partial}{\partial x}\left(\frac{1}{k_0} \epsilon_z^{-1} \dfrac{\partial}{\partial x} h_y\right) = k_0 \mu_y h_y$

$\beta^2 k_0^{-1} \epsilon_x^{-1} h_y - \dfrac{1}{k_0} \dfrac{\partial}{\partial x} \epsilon_z^{-1} \dfrac{\partial}{\partial x} h_y = k_0 \mu_y h_y$

$\cancel{\beta^2 h_y = \epsilon_x^{-1}}$

$\beta^2 h_y = \underline{\epsilon_x \dfrac{\partial}{\partial x} \epsilon_z^{-1} \dfrac{\partial}{\partial x}} h_y + k_0^2 \epsilon_x \mu_y h_y$

扫描全能王 创建

$\cancel{\nabla \times h = k_0 e}$

$\nabla \times h = k_0 \epsilon e$

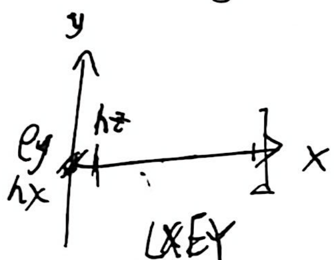
$\nabla \times e = k_0 \mu h \longrightarrow x$

e_y 、 h_x, h_z 下 红娘 红娘

$j\beta h_x - \frac{\partial h_z}{\partial x} = k_0 \epsilon_y e_y$

$-j\beta e_y = k_0 \mu_x h_x$

$\frac{\partial}{\partial x} e_y = k_0 \mu_z h_z$



$\cancel{LXEY}$

$\cancel{LX}$

$LX =$

h_z

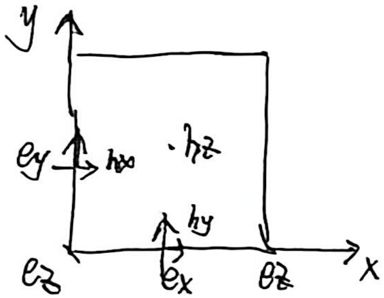
$\cancel{j\beta \quad -j\beta e_y}$ h_x

$j\beta\left(-j\beta k_0^{-1} \mu_x^{-1} e_y\right) - \frac{\partial}{\partial x}\left(k_0^{-1} \mu_z^{-1} \frac{\partial}{\partial x} e_y\right) = k_0 \epsilon_y e_y$

$\beta^2 e_y = \mu_x \frac{\partial}{\partial x} \mu_z^{-1} \frac{\partial}{\partial x} e_y + k_0^2 \mu_x \epsilon_y e_y$

$\nabla\times h = k_0 \epsilon e$

$\nabla\times e = k_0 \mu h$



对磁场 $V_x = \begin{bmatrix} -1 & 1 & & \\ & -1 & 1 & \\ & & \ddots & \ddots \\ & & & -1 \quad 1 \end{bmatrix} h$ $/d_y$

重复 n_y.

$\cancel{\frac{\partial e_z}{\partial y} = j\beta e_y}$

对电场的偏导数 U.

$$\frac{\partial h_z}{\partial y} - j\beta h_y = k_0 \epsilon_x e_x$$

$$j\beta h_x - \frac{\partial h_z}{\partial x} = k_0 \epsilon_y e_y$$

$$\frac{\partial h_y}{\partial x} - \frac{\partial h_x}{\partial y} = k_0 \epsilon_z e_z$$

$U_x = \begin{bmatrix} -1 & 1 & & \\ & -1 & 1 & \\ & & \ddots & \\ & & -1 & 1 \\ \text{零和最后一行} & & & -1 \quad 1 \end{bmatrix} e$ $/d_x$

重复 n_y

第一行 ~~一个行~~ 第二行. 一直排列.

对磁场 V

$V_y = \begin{bmatrix} n_x \text{行} \ 0 \\ -1 & 1 & & \\ & -1 & 1 & \\ & & -1 & 1 \end{bmatrix} h$ $/d_y$

$$\beta \begin{bmatrix} h_x \\ h_y \end{bmatrix} = -jP \begin{bmatrix} e_x \\ e_y \end{bmatrix}$$

$$j\beta \begin{bmatrix} h_x \\ h_y \end{bmatrix} = P \begin{bmatrix} e_x \\ e_y \end{bmatrix}$$

对

$$\frac{\partial e_z}{\partial y} - j\beta e_y = k_0 \mu_x h_x$$

$$j\beta e_x - \frac{\partial e_z}{\partial x} = k_0 \mu_y h_y$$

$$\frac{\partial e_y}{\partial x} - \frac{\partial e_x}{\partial y} = k_0 \mu_z h_z$$

$U_y = \begin{bmatrix} -1 & \cdots & 1 & \\ & -1 & \cdots & 1 \\ & & & \vdots \\ \text{最后} & n_x \text{行} & & \\ \text{最后} & n_x \text{行} & & \end{bmatrix} e$ $/d_y$

$$\boxed{\begin{aligned} j\beta h_x &= -V_x k_0^{-1} \mu_z^{-1} U_y e_x + (V_x k_0^{-1} \mu_z^{-1} U_x + k_0 \epsilon_y) e_y \\ j\beta h_y &= (-V_y k_0^{-1} \mu_z^{-1} U_y - k_0 \epsilon_x) e_x + V_y k_0^{-1} \mu_z^{-1} U_x e_y \end{aligned}}$$

$$V_y h_z - j\beta h_y = k_0 \epsilon_x e_x$$

$$j\beta h_x - V_x h_z = k_0 \epsilon_y e_y$$

$$U_x e_y - U_y e_x = k_0 \mu_z h_z$$

$\Rightarrow$

$\cancel{V_y h_z - j\beta k_0^{-1} \mu_z^{-1} (U_x e_y - U_y e_x) = k_0 \epsilon_x e_x}$

$$j\beta h_x - V_x k_0^{-1} \mu_z^{-1} (U_x e_y - U_y e_x) = k_0 \epsilon_y e_y$$

$$V_y k_0^{-1} \mu_z^{-1} (U_x e_y - U_y e_x) - j\beta h_y = k_0 \epsilon_x e_x$$

$\Rightarrow$

$$V_x h_y - V_y h_x = k_0 \epsilon_z e_z$$

$$\left.\begin{aligned} U_y e_z - j\beta e_y &= k_0 \mu_x h_x \\ j\beta e_x - U_x e_z &= k_0 \mu_y h_y \end{aligned}\right\}$$

$$\Rightarrow U_y k_0^{-1} \epsilon_z^{-1} (V_x h_y - V_y h_x) - j\beta e_y = k_0 \mu_x h_x$$

$$j\beta e_x - U_x k_0^{-1} \epsilon_z^{-1} (V_x h_y - V_y h_x) = k_0 \mu_y h_y$$

$$j\beta e_x = -U_x k_0^{-1} \epsilon_z^{-1} V_y h_x + (U_x k_0^{-1} \epsilon_z^{-1} V_x + k_0 \mu_y) h_y$$

$$\beta \begin{bmatrix} h_x \\ h_y \end{bmatrix} = -jP \begin{bmatrix} e_x \\ e_y \end{bmatrix}$$

$$j\beta e_y = (-U_y k_0^{-1} \epsilon_z^{-1} V_y - k_0 \mu_x) h_x + U_y k_0^{-1} \epsilon_z^{-1} V_x h_y$$

$$j\beta \begin{bmatrix} e_x \\ e_y \end{bmatrix} = Q \begin{bmatrix} h_x \\ h_y \end{bmatrix}$$

或者 $\beta \begin{bmatrix} e_x \\ e_y \end{bmatrix} = -jQ \begin{bmatrix} h_x \\ h_y \end{bmatrix}$

$$j\beta \begin{bmatrix} e_x \\ e_y \end{bmatrix} = Q \frac{1}{j\beta} P \begin{bmatrix} e_x \\ e_y \end{bmatrix}$$

$$\beta^2 \begin{bmatrix} e_x \\ e_y \end{bmatrix} = -QP \begin{bmatrix} e_x \\ e_y \end{bmatrix}$$

$$\Rightarrow -\beta^2 \begin{bmatrix} e_x \\ e_y \end{bmatrix} = QP \begin{bmatrix} e_x \\ e_y \end{bmatrix}$$