数学作业纸

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第1-1次作业

1-1 瞬时：

解：① $\sin(\omega t+\beta z)=\cos(\omega t+\beta z-\frac{\pi}{2})$

复振幅：

$\dot{U}(z)=e^{j\beta z-j\frac{\pi}{2}}$

② 瞬时：

$\sin\beta z\sin\omega t=-\frac{1}{2}[\cos(\beta z+\omega t)-\cos(\beta z-\omega t)]$

复振幅：

$\dot{U}(z)=-\frac{1}{2}[e^{j\beta z}-e^{-j\beta z}]$

③ 瞬时：

$e^{-\alpha z}\cos(\omega t-\beta z)$

复振幅

$\dot{U}(z)=e^{-\alpha z}\cdot e^{-j\beta z}$

④ 瞬时：

~~$u(z,t)$~~ $\vec{E}=\vec{E}_R\cos\omega t-\vec{E}_I\sin\omega t$

$\dot{\vec{E}}=\vec{E}_R+j\vec{E}_I$.

1-2

解：① $\dot{U}(z)=(1+j)e^{j\beta z}$.

$u(z,t)=\cos(\omega t+\beta z)-\sin(\omega t+\beta z)$

② $\dot{U}(z)=j\sin\beta z$

$=\frac{1}{2}(e^{j\beta z}-e^{-j\beta z})$

$=\frac{1}{2}[\cos(\omega t+\beta z)-\cos(\beta z-\omega t)]$

③ $\dot{U}(z)=e^{\alpha z}e^{j\beta z}$

$u(z,t)=e^{\alpha z}\cdot\cos(\omega t+\beta z)$

④ $\vec{E}=\hat{i}_x(5+3j)+\hat{i}_y(2+3j)$

~~$(5\hat{i}_x+2\hat{i}_y)\cos\omega t+j(3\hat{i}_x+3\hat{i}_y)\sin\omega t$~~

$(5\hat{i}_x+2\hat{i}_y)\cos\omega t-(3\hat{i}_x+3\hat{i}_y)\sin\omega t$

1-3

①解：~~$\vec{E}=(\hat{i}_x+\hat{i}_y)$~~

$\vec{E}=(\hat{i}_x+\hat{i}_z)E_0\cos(\omega t+\beta y)$

$\dot{\vec{E}}=(\hat{i}_x+\hat{i}_y)E_0e^{j\beta y}$

传播方向：-y方向

$\dot{\vec{H}}=\frac{1}{\eta_0}\hat{i}_k\times\dot{\vec{E}}$

$=\frac{E_0}{\eta_0}(\hat{i}_z-\hat{i}_z)e^{j\beta y}$

线极化波.

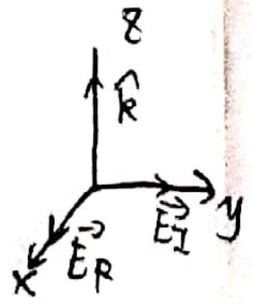
②解：$\vec{E}=\hat{i}_xE_0\cos(\omega t-\beta z)-\hat{i}_yE_0\sin(\omega t-\beta z)$

$\dot{\vec{E}}=(\hat{i}_x+j\hat{i}_y)E_0e^{-j\beta z}$.

传播方向：+z方向

$\dot{\vec{H}}=\frac{1}{\eta_0}(-\hat{i}_z)\times\dot{\vec{E}}$

$=\frac{E_0}{\eta_0}(\hat{i}_y-j\hat{i}_x)e^{-j\beta z}$.



~~本旋~~

$|\vec{E}_R|=|\vec{E}_I|$ $\vec{E}_R\cdot\vec{E}_I=0$.

左旋圆极化波