Phys 273 - Formula Sheet #3

$$P = \frac{1}{2} Z\omega^2 A^2$$

$$v = \frac{1}{\sqrt{L_0 C_0}},\ Z_0 = \sqrt{\frac{L_0}{C_0}}$$

$$\frac{V_-}{V_+} = \frac{Z_L - Z_0}{Z_L + Z_0},\quad \frac{V_L}{V_+} = \frac{2Z_L}{Z_L + Z_0},\quad \frac{I_-}{I_+} = \frac{Z_0 - Z_L}{Z_0 + Z_L},\ \frac{I_L}{I_+} = \frac{2Z_0}{Z_L + Z_0}$$

$$y(x,t) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} dk A(k) e^{i(kx - \omega(k)t)}$$

$$v_p \equiv \frac{\omega(k)}{k},\ v_g = \frac{d\omega}{dk}$$

$$I = 4A^2 \cos^2\left(\frac{\Delta\phi}{2}\right) = I_0 \cos^2\left(\frac{\Delta\phi}{2}\right)$$

$$I = I_0 \frac{\sin^2(\beta)}{\beta^2},\ \beta = \frac{1}{2} kb\sin(\theta)$$

$$I = I_0 \frac{\sin^2(\beta)}{\beta^2}\cos^2(\alpha),\ \alpha = \frac{1}{2} ka\sin(\theta)$$

$$\oint_{surface} \vec{E}\cdot\hat{n}dA = \frac{Q_{enclosed}}{\varepsilon_0}$$

$$\oint_{surface} \vec{B}\cdot\hat{n}dA = 0$$

$$\oint_{curve} \vec{E}\cdot d\vec{\ell} = -\frac{d\varphi_M}{dt}$$

$$\oint_{curve} \vec{B}\cdot d\vec{\ell} = \mu_0 I + \mu_0\varepsilon_0 \frac{d\phi_E}{dt}$$

$$\nabla\cdot\vec{E} = \frac{\rho}{\varepsilon_0}$$

$$\nabla\cdot\vec{B} = 0$$

$$\nabla\times\vec{E} = -\frac{\partial\vec{B}}{\partial t}$$

$$\nabla\times\vec{B} = \mu_0\vec{J} + \mu_0\varepsilon_0\frac{\partial\vec{E}}{\partial t}$$

$$\int_{volume} (\nabla\cdot\vec{v})dV = \oint_{surface} \vec{v}\cdot\hat{n}\,da$$

$$\int_{surface} \left(\nabla\times\vec{v}\right)\cdot\hat{n}da = \oint_{curve} \vec{v}\cdot d\vec{\ell}$$

$$\nabla^2\vec{E} = \mu_0\varepsilon_0\frac{\partial^2\vec{E}}{\partial t^2}, \nabla^2\vec{B} = \mu_0\varepsilon_0\frac{\partial^2\vec{B}}{\partial t^2},\ v_{phase} = \frac{1}{\sqrt{\mu_0\varepsilon_0}}$$

$$\vec{E}(z,t) = \vec{E}_0 e^{i(kz-\omega t)}, \vec{B}(z,t) = \vec{B}_0 e^{i(kz-\omega t)},\ \vec{E}\cdot\vec{B} = 0, \vec{E}\cdot\hat{z} = 0, \vec{B}\cdot\hat{z} = 0,\ \left|\vec{E}_0\right| = c\left|\vec{B}_0\right|$$