Maxwell's equations:

$$\vec{\nabla}\cdot\vec{D}=\rho_f \qquad \nabla\cdot\vec{B}=0$$

$$\vec{\nabla}\times\vec{E}=-\frac{\partial\vec{B}}{\partial t} \qquad \vec{\nabla}\times\vec{H}=J_f+\frac{\partial\vec{D}}{\partial t} \qquad \vec{D}=\varepsilon\vec{E} \qquad \vec{H}=\frac{1}{\mu}\vec{B}$$

Wave equation: $$\nabla^2\psi(\vec{r},t)=\frac{1}{v^2}\frac{\partial^2\psi(\vec{r},t)}{\partial t^2}$$

Wave velocities: $\boldsymbol{v_p}=\dfrac{\boldsymbol{\omega}}{\boldsymbol{k}}$, $\boldsymbol{v_g}=\dfrac{\boldsymbol{d\omega}}{\boldsymbol{dk}}$

Plane wave: $$\vec{E}(\vec{r},t)=\tilde{\vec{E}}_0 e^{i(\vec{k}\cdot\vec{r}-\omega t)} \qquad \tilde{\vec{E}}_0\cdot\vec{k}=0 \qquad \omega\tilde{\vec{B}}_0=\vec{k}\times\tilde{\vec{E}}_0$$

Poynting vector: $$\vec{S}=\vec{E}\times\vec{H}$$

Field energy: $$U=\frac{1}{2}\vec{E}\cdot\vec{D}+\frac{1}{2}\vec{B}\cdot\vec{H}$$

Stress tensor: $$T_{ij}=\left(E_iD_j-\tfrac{1}{2}\delta_{ij}\vec{E}\cdot\vec{D}\right)+\left(B_iH_j-\tfrac{1}{2}\delta_{ij}\vec{B}\cdot\vec{H}\right)$$

Force density: $$\vec{f}=\vec{\nabla}\cdot\vec{T}-\varepsilon\mu\frac{\partial\vec{S}}{\partial t}$$

Continuity equation: $$\vec{\nabla}\cdot\vec{j}_Q=-\frac{\partial\rho_Q}{\partial t}$$

Impedance: $Z=\dfrac{\boldsymbol{V}}{\boldsymbol{I}}$

Electric dipole radiation:

$$\vec{E}(\vec{r},t)=\frac{\mu_0}{4\pi r}\left(\hat{r}\times\left(\hat{r}\times\ddot{\vec{p}}\right)\right)=\frac{\mu_0\ddot{p}}{4\pi}\left(\frac{\sin\theta}{r}\right)\hat{\theta} \qquad \vec{B}(\vec{r},t)=\frac{\hat{r}\times\vec{E}}{c}$$

$$\langle\vec{S}\rangle=\left(\frac{\mu_0p_0^2\omega^4}{32\pi^2c}\right)\frac{\sin^2\theta}{r^2}\hat{r}$$

Radiation from a point charge: $\vec{E}=\dfrac{q}{4\pi\varepsilon_0(\vec{\mathscr{r}}\cdot\vec{u})^3}\left(\vec{\mathscr{r}}\times(\vec{u}\times\vec{a})\right)$, where $\vec{u}=c\vec{\mathscr{r}}-\vec{v}$. $P=\dfrac{\mu_0q^2a^2}{6\pi c}$

Math:

Fourier analysis: $$\tilde{f}(z,t)=\int_{-\infty}^{+\infty}\tilde{A}(k)e^{i(kz-\omega t)}dk \qquad \tilde{A}(k)=\frac{1}{2\pi}\int_{-\infty}^{+\infty}\left[f(z,0)+\tfrac{i}{\omega}\tfrac{\partial f(z,0)}{\partial t}\right]e^{-ikz}dz$$

$$\mathrm{e}^{i\theta}=\cos\theta+i\sin\theta$$

$$\vec{\nabla}\times(f\vec{A})=f(\vec{\nabla}\times\vec{A})-\vec{A}\times(\vec{\nabla}f)$$

$$\vec{\nabla}\times(\vec{\nabla}\times\vec{A})=\vec{\nabla}(\vec{\nabla}\cdot\vec{A})-\nabla^2\vec{A}$$

$$\vec{\nabla}\cdot(\vec{A}\times\vec{B})=\vec{B}\cdot(\vec{\nabla}\times\vec{A})-\vec{A}\cdot(\vec{\nabla}\times\vec{B})$$

$$\vec{\nabla}\times(\vec{A}\times\vec{B})=(\vec{B}\cdot\vec{\nabla})\vec{A}-(\vec{A}\cdot\vec{\nabla})\vec{B}+\vec{A}(\vec{\nabla}\cdot\vec{B})-\vec{B}(\vec{\nabla}\cdot\vec{A})$$

Spherical unit vectors:

$$\hat{r}=\sin\theta\cos\phi\hat{x}+\sin\theta\sin\phi\hat{y}+\cos\theta\hat{z}$$
$$\hat{\theta}=\cos\theta\cos\phi\hat{x}+\cos\theta\sin\phi\hat{y}-\sin\theta\hat{z}$$
$$\hat{\phi}=-\sin\phi\hat{x}+\cos\phi\hat{y}$$

Cylindrical unit vectors:

$$\hat{s}=\cos\phi\hat{x}+\sin\phi\hat{y}$$
$$\hat{\phi}=-\sin\phi\hat{x}+\cos\phi\hat{y}$$