Maxwell's Equations

Differential Form

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\epsilon_0}$$

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

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

$$c^2 \nabla \times \mathbf{B} = \frac{\mathbf{J}}{\epsilon_0} + \frac{\partial \mathbf{E}}{\partial t}$$

Integral Form

$$\oiint_{\partial\Omega} \mathbf{E} \cdot d\mathbf{S} = \frac{1}{\epsilon_0} \iiint_{\Omega} \rho \ d\mathbf{V}$$

$$\oint_{\partial\Sigma} \mathbf{E} \cdot \ d\mathbf{r} = -\frac{d}{dt} \iint_{\Sigma} \mathbf{B} \cdot \ d\mathbf{S}$$

$$\oiint_{\partial\Omega} \mathbf{B} \cdot \ d\mathbf{S} = 0$$

$$\oint_{\partial\Omega} \mathbf{B} \cdot \ d\mathbf{r} = \mu_0 \oint_{\partial\Sigma} \mathbf{J} \cdot \ d\mathbf{S} + \frac{1}{c^2} \frac{d}{dt} \iint_{\Sigma} \mathbf{E} \cdot \ d\mathbf{S}$$

The Rest of Classical Physics

$$\nabla \cdot \mathbf{J} = \frac{\partial \rho}{\partial t}$$

$$\mathbf{F} = q(\mathbf{E} + \mathbf{v} \times \mathbf{B})$$

$$\mathbf{F} = \frac{d\mathbf{P}}{dt}$$

$$\text{where } \mathbf{P} = \frac{m\mathbf{v}}{\sqrt{1 - \frac{\|\mathbf{v}\|^2}{c^2}}}$$

$$\mathbf{F} = -G \frac{m_0 m_1}{\|\mathbf{r}\|^2} \mathbf{e}_r$$