微分形式，守恒定律和经典电磁学

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$$\oint_L (\vec{v} \times \vec{B}) \cdot d\vec{l} = -\frac{d}{dt}\iint_S \vec{B} \cdot d\vec{S} + \iint_S \frac{\partial \vec{B}}{\partial t} \cdot d\vec{S}$$

$$\oiint_S \vec{v}\rho \cdot d\vec{S} = -\frac{d}{dt}\iiint_V \rho dV + \iiint_V \frac{\partial \rho}{\partial t} dV$$

$$\oint \omega_{(\vec{v})} = -\frac{d}{dt}\int \omega + \oint \frac{\partial \omega}{\partial t}$$

$$\vec{\nabla} \cdot \vec{j} + \frac{\partial \rho}{\partial t} = 0$$

$$\vec{\nabla} \times \vec{E} + \frac{\partial \vec{B}}{\partial t} = 0$$

$$\vec{\nabla} \cdot \vec{j} + \frac{\partial \rho}{\partial t} = 0$$

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

$$\vec{\nabla} \cdot (\vec{j} + \varepsilon_0 \frac{\partial \vec{E}}{\partial t}) = 0$$

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

$$\vec{\nabla} \times \vec{E} + \frac{\partial \vec{B}}{\partial t} = 0$$

$$\vec{\nabla} \times \vec{E} + \frac{\partial \vec{B}}{\partial t} = 0$$

$$\vec{\nabla} \times \vec{A} = \vec{B}$$

$$\vec{\nabla} \times (\vec{E} + \frac{\partial \vec{A}}{\partial t}) = 0$$

$$\vec{\nabla} \cdot \vec{A} + \frac{1}{c^2}\frac{\partial \varphi}{\partial t} = 0$$

$$\vec{\nabla} \varphi = -\vec{E} - \frac{\partial \vec{A}}{\partial t}$$

$$\rho \sim \vec{B}$$

$$\vec{j} \sim \vec{E}$$

$$\vec{E} \sim \vec{A}$$

$$\vec{B} \sim \varphi$$

$$d\Omega + \frac{\partial \varpi}{\partial t} = 0$$

$$d\,\varpi = 0$$

$$d\,\mathfrak{R} = \varpi$$

$$d\,(\Omega + \frac{\partial \mathfrak{R}}{\partial t}) = 0$$

$$d\mathfrak{I} = \Omega + \frac{\partial \mathfrak{R}}{\partial t}$$

$$d\widetilde{\mathfrak{R}} + \kappa\,\frac{\partial \widetilde{\mathfrak{I}}}{\partial t} = 0$$

$$d\,\mu = 0$$

$$d\,\chi = 0$$

$$d\,\varsigma = 0$$

$$d\,\mu\,\widetilde{\varsigma} = \chi$$