1 Overview

1.1 Taking the divergence of both sides of Eq. (1.1d),

$$\boldsymbol{\nabla} \cdot (\boldsymbol{\nabla} \times \boldsymbol{B}) = \mu_0 \boldsymbol{\nabla} \cdot \boldsymbol{j} + \frac{1}{c^2} \frac{\partial \boldsymbol{\nabla} \cdot \boldsymbol{E}}{\partial t}.$$

Using $\boldsymbol{\nabla} \cdot \boldsymbol{E} = \rho / \varepsilon_0$ from Eq. (1.1a), the identity $\boldsymbol{\nabla} \cdot (\boldsymbol{\nabla} \times \boldsymbol{B}) = 0$ from Eq. (A.6), and that $\mu_0 \varepsilon_0 = 1/c^2$, this becomes

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

which is the continuity equation (1.3).