

Maxwells ligninger

Elektrostatikk/Magnetostatikk:

$$\oint \vec{E} \cdot d\vec{A} = \frac{q}{e_0}$$

$$\nabla \cdot \vec{E} = \frac{\rho}{e_0}$$

$$\oint \vec{E} \cdot d\vec{l} = 0$$

$$\nabla \times \vec{E} = 0$$

$$\oint \vec{B} \cdot d\vec{A} = 0$$

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

$$\oint \vec{B} \cdot d\vec{l} = \mu_0 I$$

$$\nabla \times \vec{B} = \mu_0 \vec{j}$$

Med lineære medier:

$$\oint \vec{D} \cdot d\vec{A} = q_{\text{fri}}$$

$$\nabla \cdot \vec{D} = \rho_{\text{fri}}$$

$$\oint \vec{E} \cdot d\vec{l} = 0$$

$$\nabla \times \vec{E} = 0$$

$$\oint \vec{B} \cdot d\vec{A} = 0$$

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

$$\oint \vec{H} \cdot d\vec{l} = I_{\text{fri}}$$

$$\nabla \times \vec{H} = \vec{j}_{\text{fri}}$$

”Konstitutive relasjoner”:

$$\vec{D} = e_0 \vec{E} + \vec{P} \quad \vec{P} = c_e e_0 \vec{E}$$

$$\Rightarrow \vec{D} = (1 + c_e) e_0 \vec{E} = e_r e_0 \vec{E} = e \vec{E}$$

$$\vec{H} = m_0^{-1} \vec{B} - \vec{M} \quad \vec{M} = c_m \vec{H}$$

$$\Rightarrow \vec{H} = (1 + c_m)^{-1} m_0^{-1} \vec{B} = m_r^{-1} m_0^{-1} \vec{B} = m^{-1} \vec{B}$$

Elektrodynamikk (tidsvarierende felt):

$$\oint \vec{E} \cdot d\vec{A} = \frac{q}{e_0}$$

$$\nabla \cdot \vec{E} = \frac{r}{e_0}$$

$$\oint \vec{E} \cdot d\vec{l} = -\frac{d}{dt} \int \vec{B} \cdot d\vec{A}$$

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

$$\oint \vec{B} \cdot d\vec{A} = 0$$

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

$$\oint \vec{B} \cdot d\vec{l} = m_0 I + m_0 e_0 \frac{d}{dt} \int \vec{E} \cdot d\vec{A}$$

$$\nabla \times \vec{B} = m_0 \vec{j} + m_0 e_0 \frac{\partial \vec{E}}{\partial t}$$

Med lineære medier:

$$\oint \vec{D} \cdot d\vec{A} = q_{fri}$$

$$\nabla \cdot \vec{D} = r_{fri}$$

$$\oint \vec{E} \cdot d\vec{l} = -\frac{d}{dt} \int \vec{B} \cdot d\vec{A}$$

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

$$\oint \vec{B} \cdot d\vec{A} = 0$$

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

$$\oint \vec{H} \cdot d\vec{l} = I_{fri} + \frac{d}{dt} \int \vec{D} \cdot d\vec{A}$$

$$\nabla \times \vec{H} = \vec{j}_{fri} + \frac{\partial \vec{D}}{\partial t}$$