Momentum

$$\vec{F} = \frac{d\vec{p}_{mech}}{dt}$$

$$\frac{d\vec{p}_{mech}}{dt} = -\,\varepsilon_0\mu_0 \frac{d}{dt}\int \vec{S}\, d^3r$$

$$+ \oint \overleftrightarrow{T}\cdot d\vec{s}$$

$$p_{em} = \mu_0\varepsilon_0 \int \vec{S}\, d^3r$$

$\mu_0\varepsilon_0\vec{S}$ – momentum per volume

$$\vec{\mathcal{P}}_{em} = \mu_0\varepsilon_0\vec{S} = \frac{1}{c^2}\vec{S}$$

$$\frac{\partial}{\partial t}\left(\vec{\mathcal{P}}_{mech} + \vec{\mathcal{P}}_{em}\right) = \nabla\cdot\overleftrightarrow{T}$$

$-\overleftrightarrow{T}$ momentum flux density

— T_{ij} momentum in the i direction crossing a surface oriented in j direction per area per second