Two Additional Equations of Inductance

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Abstract

For the sake of completeness the classical electrodynamics needs two additional equations of inductance.

As already shown in "Das Elementare Gesetz Der Induktion" (https://vixra.org/pdf/2110.0100v1.pdf), the law of induction can be simplified to the following formula:

$$\vec{E}\vec{n} = -\oint \frac{d\vec{B}}{dt} d\vec{l} \quad (1)$$

where $\vec{n}$ is the surface normal and $d\vec{l}$ is the edge element of the surface. This is supported, for example, by the effect of self-inductance. The straight wires also have a certain inductance. Therefore in the case of a variable current the opposite voltage would be induced also in straight wires, but this obviously does not happen through the rotation of the electric field.

Because of the symmetry the counterpart for equation (1) would have looked like this:

$$\vec{B}\vec{n} = -\frac{1}{c^2}\oint \frac{d\vec{E}}{dt} d\vec{l}$$

In this way the magnetic field would be induced. Basically it was about the rotation of the displacement current. And taking into account the rotation of the current density:

$$\vec{B}\vec{n} = -\oint \left(\mu_0 \vec{j} + \mu_0 \varepsilon_0 \frac{d\vec{E}}{dt}\right) d\vec{l} \quad (2)$$

So we got two additional equation of inductance for both fields.