2. Zákon zachování náboje

Wednesday, December 25, 2024 16:25

Maxwellovy rovnice:

$$\operatorname{div} \vec{B} = 0$$
$$\operatorname{div} \vec{D} = \rho_q$$
$$\operatorname{rot} \vec{E} = -\frac{\partial \vec{B}}{\partial t}$$
$$\operatorname{rot} \vec{H} = \vec{j}_q + \frac{\partial \vec{D}}{\partial t}$$

Co se s časem stane s nábojem?

$$\frac{\partial \rho_q}{\partial t} = \frac{\partial}{\partial t} \operatorname{div} \vec{D} = \operatorname{div} \frac{\partial \vec{D}}{\partial t} = \underbrace{\operatorname{div} \operatorname{rot} \vec{H}}_{0 \text{ protože vír nemí zdroj}} - \operatorname{div} \vec{j}_q$$

$$\frac{\partial \rho_q}{\partial t} = -\operatorname{div} \vec{j}_q$$

$$\boxed{\frac{\partial \rho_q}{\partial t} + \operatorname{div} \vec{j}_q = 0}$$

Rovnice kontinuity
$\Rightarrow$ náboj se zachovává