

ΟΛΟΚΛΗΡΩΤΙΚΟΙ ΝΟΜΟΙ MAXWELL

$$\begin{aligned}
 \oint_{C(S)} \vec{H}(C') \cdot d\vec{s}' &= I_u[S(C)] + I_D[S(C)] \\
 &= \sum_{S_k [L_k \in S(C)]} \int_{L_k} \vec{K}_{uk}(S'_k) \cdot \hat{n}_{L_k} dl'_k + \sum_{k \in S(C)} I_{uk} + \iint_{S(C)} \vec{J}_u(S') \cdot \hat{n}_S dS' \\
 &+ \frac{d}{dt} \iint_{S(C)} \vec{D}(S') \cdot \hat{n}_S dS' \quad \text{νομος Ampere}
 \end{aligned}$$

$$\oint_{C(S)} \vec{E}(C') \cdot d\vec{s}' = -\frac{d}{dt} \iint_{S(C)} \vec{B}(S') \cdot \hat{n}_S dS' \quad \text{νομος Faraday}$$

$$\begin{aligned}
 \oiint_{S(V)} \vec{D}(S') \cdot \hat{n}_S dS' &= Q_e[V(S)] \quad \text{νομος Gauss για ΗΠ} \\
 &= \int_{V(S)} \rho_u(V') dV' + \sum_{S_k \in V} \iint_{S_k} \sigma_{uk}(S'_k) dS'_k + \sum_{L_k \in V} \int_{L_k} \lambda_{uk}(L'_k) dl'_k + \sum_k q_k \\
 \oiint_{S(V)} \vec{B}(S') \cdot \hat{n}_S dS' &= Q_m[V(S)] = 0 \quad \text{νομος Gauss για ΜΠ}
 \end{aligned}$$

ΝΟΜΟΣ ΔΙΑΤΗΡΗΣΗΣ ΦΟΡΤΙΟΥ

$$\begin{aligned}
 &\frac{dQ_e[V(S)]}{dt} \\
 &= \frac{d}{dt} \left[\int_{V(S)} \rho_u(V') dV' + \sum_{S_k \in V(S)} \iint_{S_k} \sigma_{uk}(S'_k) dS'_k + \sum_{L_k \in V(S)} \int_{L_k} \lambda_{uk}(L'_k) dl'_k + \sum_{k \in V(S)} q_k \right] \\
 &= -I_u[S(V)] \\
 &= - \sum_{S_k (L_k \in S)} \int_{L_k} \vec{K}_{uk}(S'_k) \cdot \hat{n}_{L_k} dl'_k - \sum_{k \in S(V)} I_{uk} - \oiint_{S(V)} \vec{J}_u(S') \cdot \hat{n}_S dS'
 \end{aligned}$$

