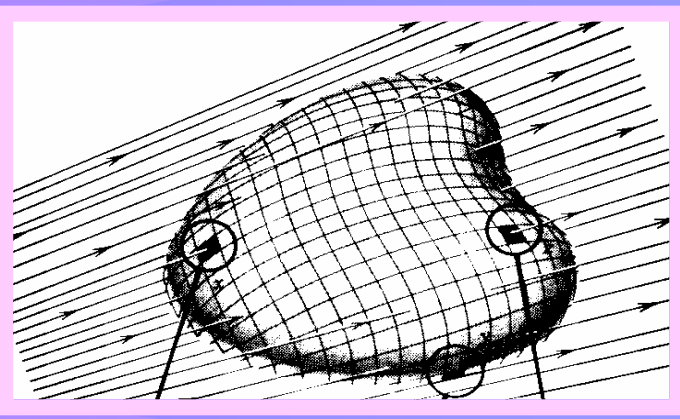
GAUSSOV ZAKON

Pojam toka polja Φ_E



polje, silnice

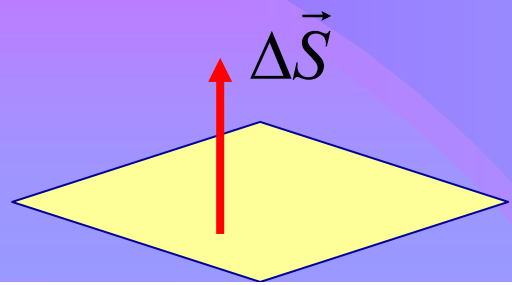
površina

Subdivizija površine u diferencijalne elemente

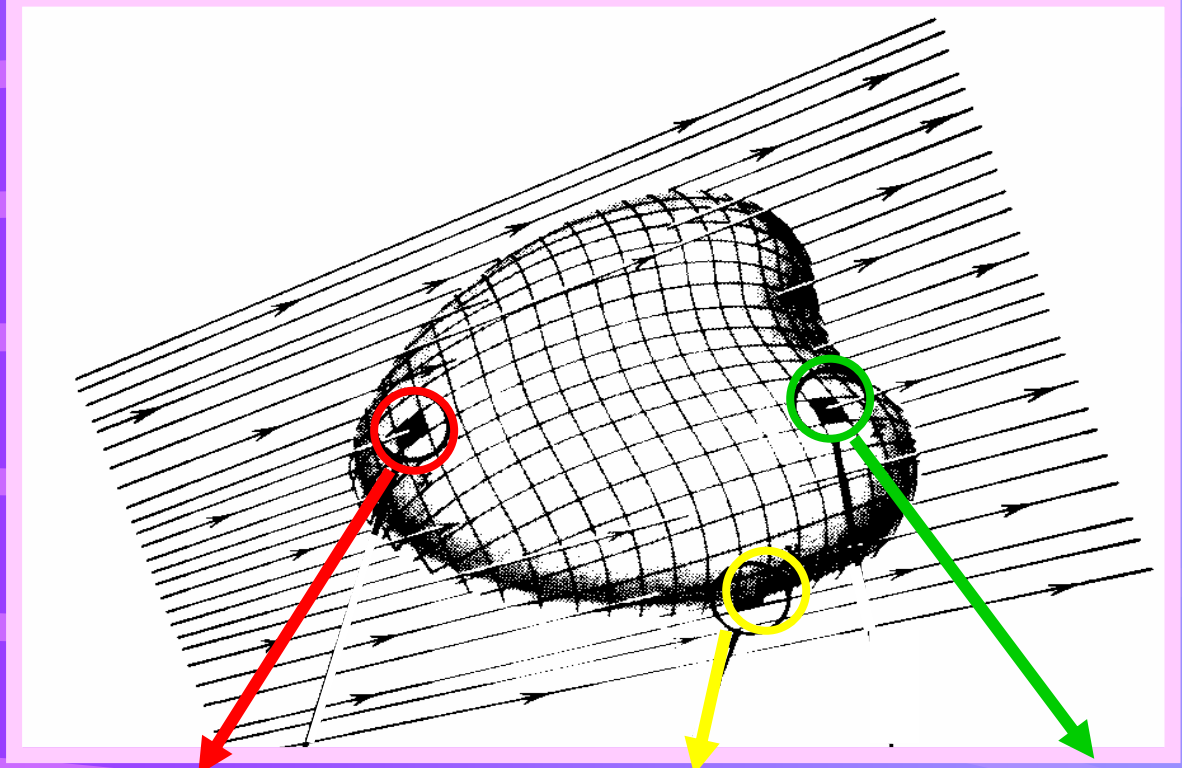
$\Delta\vec{S}$

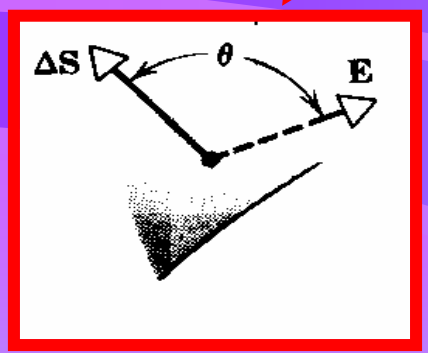
smjer:
okomica na element

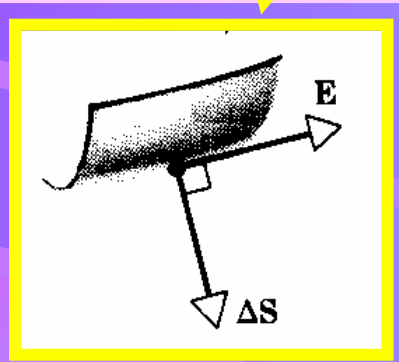
iznos:
površina elementa

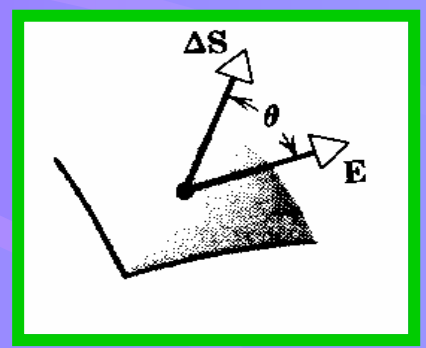


Tok električnog po









$\cos\vartheta < 0$

$\vec{E}\cdot\Delta\vec{S} < 0$

$\cos\vartheta = 0$

$\vec{E}\cdot\Delta\vec{S} = 0$

$\cos\vartheta > 0$

$\vec{E}\cdot\Delta\vec{S} > 0$

Tok električnog polj

$$\phi_E \cong \sum \vec{E} \cdot \Delta\vec{S}$$

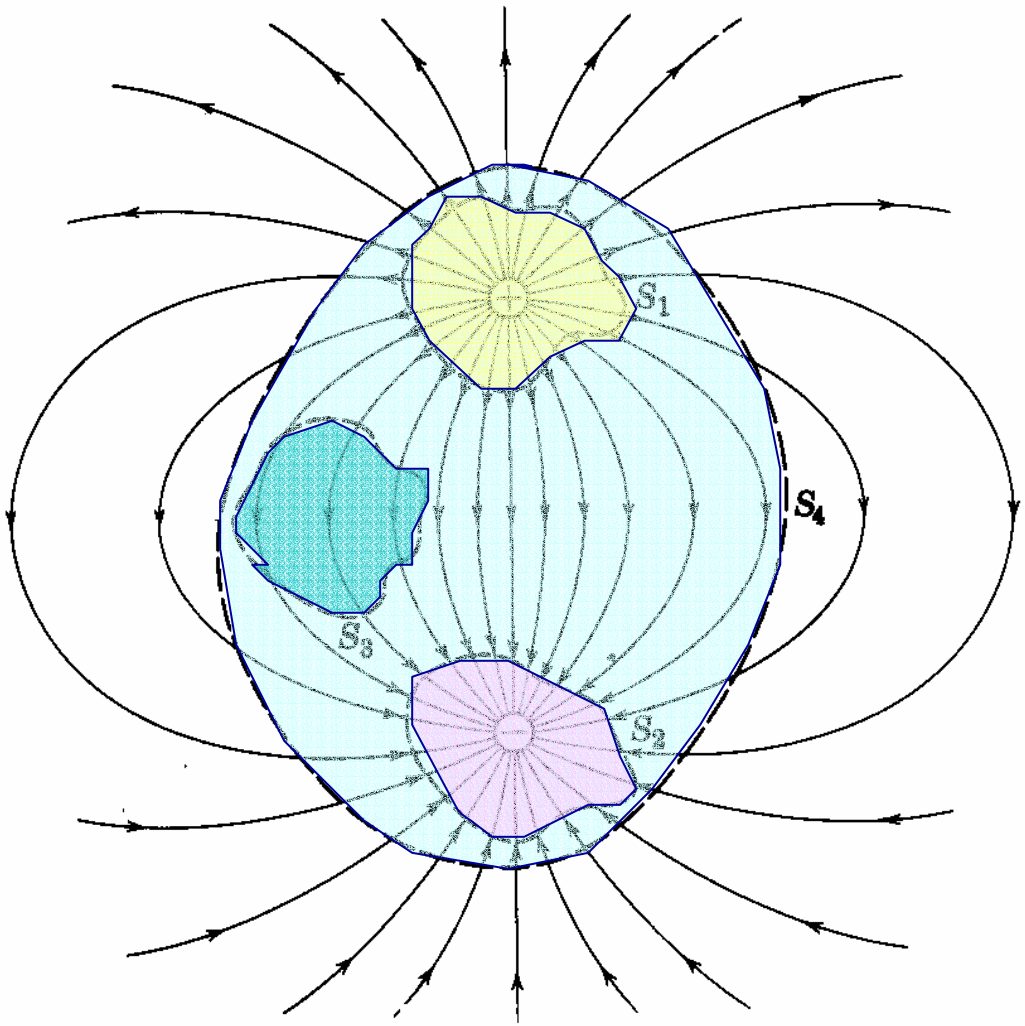
U limesu $\Delta S \to 0$

$$\phi_E = \int_S \vec{E} \cdot d\vec{S}$$

električno polje naboja q

diferencijalni element Gaussove plohe

Jedinica: Wb, 1 Weber


S_1
S_2
S_3
S_4

Gaussov zakon

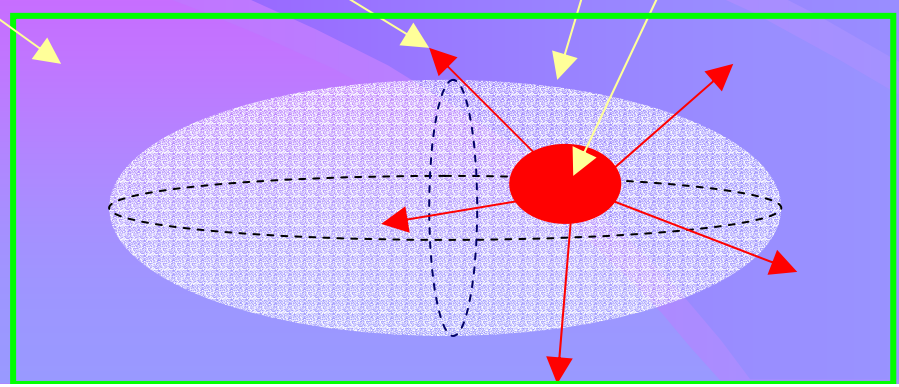
$$\varepsilon_o \int_S \vec{E} \cdot d\vec{S} = q$$

električna permitivnost vakuuma

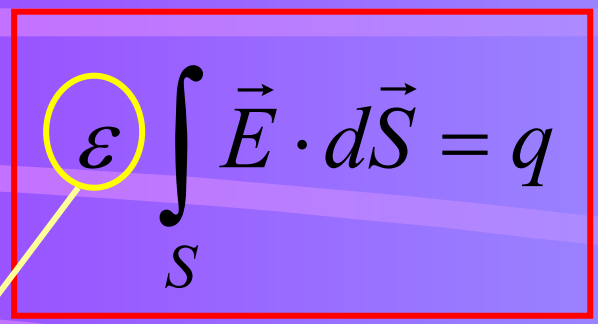
električno polje naboja q

električni naboj zatvoren Gaussovo plohom

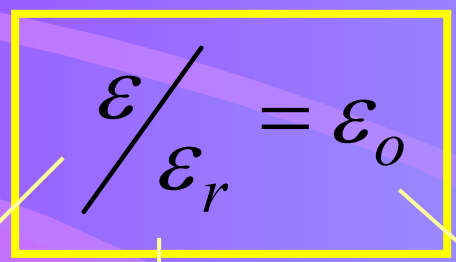
diferencijalni element plohe koja se nalazi u polju



U sredstvu...



električna permitivnost



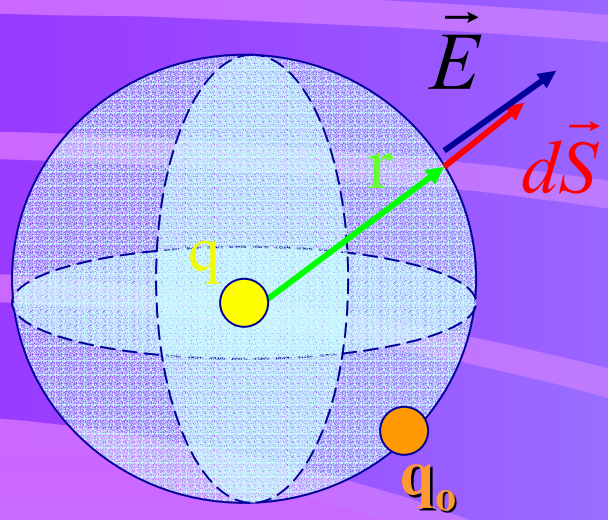
(Apsolutna) Električna permitivnost sredstva

Relativna permitivnost sredstva

Električna permitivnost vakuuma

Veza Gaussovog i Coulombovog zakona

Gaussova ploha je kugla radijusa r, u središtu koje je naboj q



$$\varepsilon_o \int_S \vec{E} \cdot d\vec{S} = q$$

$$\varepsilon_o \int_S E \cdot dS = q$$

$4r^2\pi$

$$\varepsilon_o E \int_S dS = q \qquad \varepsilon_o E 4r^2\pi = q$$

$$E = \frac{q}{\varepsilon_o 4r^2\pi} = \frac{1}{4\pi\varepsilon_o} \cdot \frac{q}{r^2}$$

$$F = Eq_o \qquad F = \frac{1}{4\pi\varepsilon_o} \cdot \frac{q}{r^2} \cdot q_o$$

$$F = \frac{1}{4\pi\varepsilon_o} \frac{q \cdot q_o}{r^2}$$

Coulombov zakon