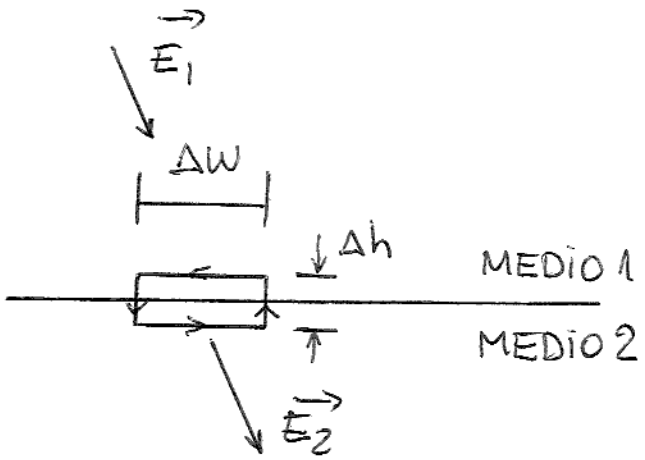
CONDICIONES DE BORDE : I

DIELECTRICO PERFECTO - COND. PERFECTO.

EJEMPLO : AIRE - METAL.



$$\oint_c \vec{E} \cdot d\vec{\ell} = 0$$ ← T/ STOKES ← ELECTROESTATICA.

$$\nabla \times \vec{E} = 0.$$

Si $\Delta h \to 0$ SOLO CONTRIBUYE A LA INTEGRAL Δw.

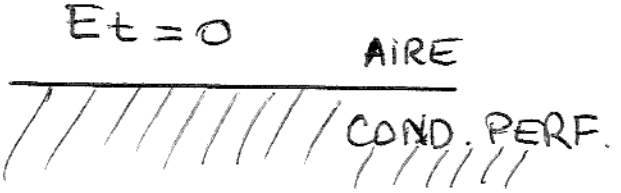
$$\vec{E_1} \cdot \Delta\vec{w} + \vec{E_2} \cdot (-\Delta\vec{w}) = 0$$

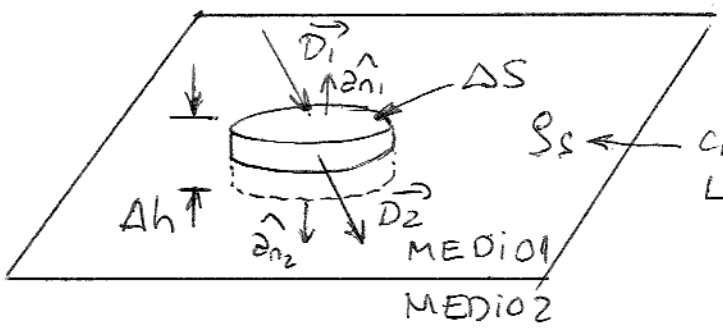
$$E_{t_1} \Delta w - E_{t_2} \Delta w = 0.$$

$$\boxed{E_{t_1} = E_{t_2}}$$

SI ES UN CONDUCTOR PERFECTO EL MEDIO 2

$$E_{t_2} = 0 \implies E_{t_1} = 0$$





LEY DE GAUSS

$$\oint_S \vec{D} \cdot d\vec{s} = Q$$

Si $\Delta h \to 0$ CONTRIBUYE SOLO ΔS

$$\oint \vec{D} \cdot d\vec{S} = \left(\vec{D_1} \cdot \hat{a}_{n_1} + \vec{D_2} \cdot \hat{a}_{n_2}\right) \Delta S$$

COMO $\hat{a}_{n_2} = -\hat{a}_{n_1}$

$$\left(\vec{D_1} - \vec{D_2}\right) \cdot \hat{a}_{n_1} \Delta S$$

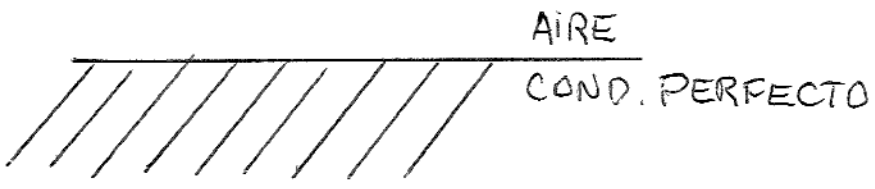
$Q = \rho_s \Delta S$.

$$\left(\vec{D_1} - \vec{D_2}\right) \cdot \hat{a}_{n_1} \cancel{\Delta S} = \rho_s \cancel{\Delta S}$$

$$\boxed{D_{n_1} - D_{n_2} = \rho_s}$$

SI EL MEDIO 2 ES COND. PERF. $D_{t_2} = 0$. $D_{n_2} = 0$

$$D_{n_1} = \rho_s \Rightarrow \boxed{E_{n_1} \epsilon_1 = \rho_s}$$

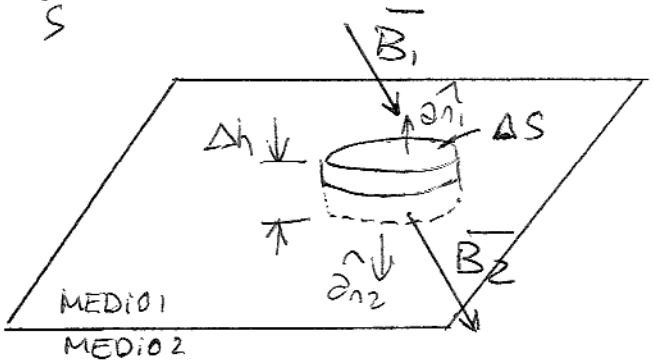


$\nabla \cdot \vec{B} = 0$ MAGNETOESTÁTICA

$$\int_V \nabla \cdot \vec{B}\, dv = 0.$$

T. DE DIVERGENCIA

$$\oint_S \vec{B} \cdot d\vec{S} = 0$$



$\Delta h \to 0.$

$$\left(\vec{B}_1 \cdot \hat{a}_{n_1} + \vec{B}_2 \cdot \hat{a}_{n_2}\right) \Delta S = 0. \qquad \hat{a}_{n_2} = -\hat{a}_{n_1}$$

$$\left(\hat{B}_{n_1} - \hat{B}_{n_2}\right) \cdot \hat{a}_{n_1} \Delta S = 0.$$

$$\boxed{B_{n_1} = B_{n_2}}$$

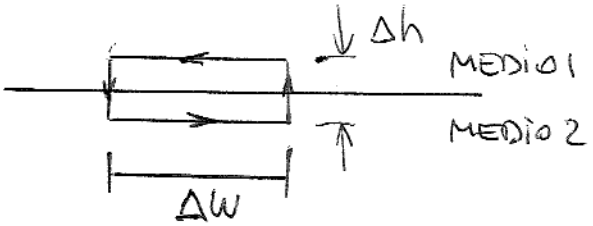
Si MEDIO 2 CONDPERF. $B_{n_2} = 0 \Rightarrow \boxed{B_{n_1} = 0}$

$\nabla \times \vec{H} = \vec{J}$ MAGNETOESTÁTICA.

$$\int_S (\nabla \times \vec{H}) \cdot d\vec{S} = \int_S \vec{J} \cdot d\vec{S} = I.$$

↓ T. STOKES

$$\oint_C \vec{H} \cdot d\vec{\ell} = I$$



$$\vec{H}_1 \cdot \Delta\vec{w} + \vec{H}_2 \cdot (-\Delta\vec{w}) = J_S \cdot \Delta w$$

$$(H_{t_1} - H_{t_2}) \cancel{\Delta w} = J_S \cancel{\Delta w}.$$

J_S: CORRIENTE EN LA INTERFAZ.

$$\boxed{H_{t_1} - H_{t_2} = J_S}$$

Si MEDIO 2 COND. PERF $H_{t_2} = 0$ $H_{n_2} = 0$ $\Rightarrow \boxed{H_{t_1} = J_S}$

RESUMEN CONDICIONES DE BORDE

CASO AIRE - METAL

$E_{t1} = 0$

$D_{n1} = \rho_s$

$B_{n1} = 0$

$H_{t1} = J_s$

$E_{t1} = 0$

$E_{n1} = \rho_s / \epsilon_1$

$H_{n1} = 0$

$H_{t1} = J_s$