$$\iint_S B \cdot ds \qquad B \in \mathbb{R}^3 \text{ (\underline{No} es un campo!)}$$

por ejemplo $B = (1,2,3)$ ó $(7,-5,38\pi)$

$B = (a,b,c)$ con $a,b,c \in \mathbb{R}$

Debería componer! ??

$$= \iint_{uv} \langle (a,b,c), T_u \times T_v \rangle \, du\, dv$$

Green

$$\int_{\partial D} F \cdot ds = \iint_D Q_x - P_y$$

Stokes

$$\int_{\partial S} F \cdot ds = \iint_S \nabla \times F \cdot ds$$

$\langle \nabla \times F(T(u,v)), T_u \times T_v \rangle$

$\exists$ un $\nabla \times F$ / $\nabla \times F(x,y,z) = B \in \mathbb{R}^3$

$F \in C^1$ por cte.

$$\iint_{S_1} B \cdot ds = \iint_{S_1} \nabla \times F \cdot ds = \iint_{\partial S_1} F \cdot ds$$

$$\nabla \times F = \begin{vmatrix} i & j & k \\ \partial/\partial x & \partial/\partial y & \partial/\partial z \\ P & Q & R \end{vmatrix}$$

$$\iint_{S_2} B \cdot ds = \iint_{S_2} \nabla \times F \cdot ds = \iint_{\partial S_2} F \cdot ds$$

Como

$\partial S_1 = \partial S_2$

$$\Rightarrow \iint_{\partial S_1} F \cdot ds = \iint_{\partial S_2} F \cdot ds \quad \text{ó} \quad \iint_{\partial S_1} F \cdot ds = -\iint_{\partial S_2} F \cdot ds$$

$\therefore \quad \left(\iint_{\partial S_1} F \cdot ds\right)^2 = \left(\iint_{\partial S_2} F \cdot ds\right)^2$

$\qquad\quad \shortparallel \qquad\qquad\qquad\qquad \shortparallel$

$$\left(\iint_{S_2} B \cdot ds\right)^2 = \left(\iint_{S_2} B \cdot ds\right)^2$$

Findmate

$$\left(\iint_{S_2} B \cdot ds\right)^2 - \left(\iint_{S_2} B \cdot ds\right)^2 = 0$$

$$\begin{vmatrix} i & j & k \\ \partial/\partial x & \partial/\partial y & \partial/\partial z \\ P & Q & R \end{vmatrix}$$

$$= (\underbrace{R_y - Q_z}_{a}, \underbrace{P_z - R_x}_{b}, \underbrace{Q_x - P_y}_{c})$$

$Q_z = 0$

$R_x = 0$

$P_y = 0$

$$= (R_y, P_z, Q_x)$$

$$\left.\begin{array}{lll} R_y = a & \Rightarrow & R = a.y \\ P_z = b & \Rightarrow & P = b.z \\ Q_x = c & \Rightarrow & Q = c.x \end{array}\right\} F = (b.z, c.x, a.y)$$

Obtuve F / $\nabla \times F = (a, b, c) = B \quad \forall (a,b,c) \in \mathbb{R}^3$