

Eletromagnetismo

23 de março
Análise vetorial

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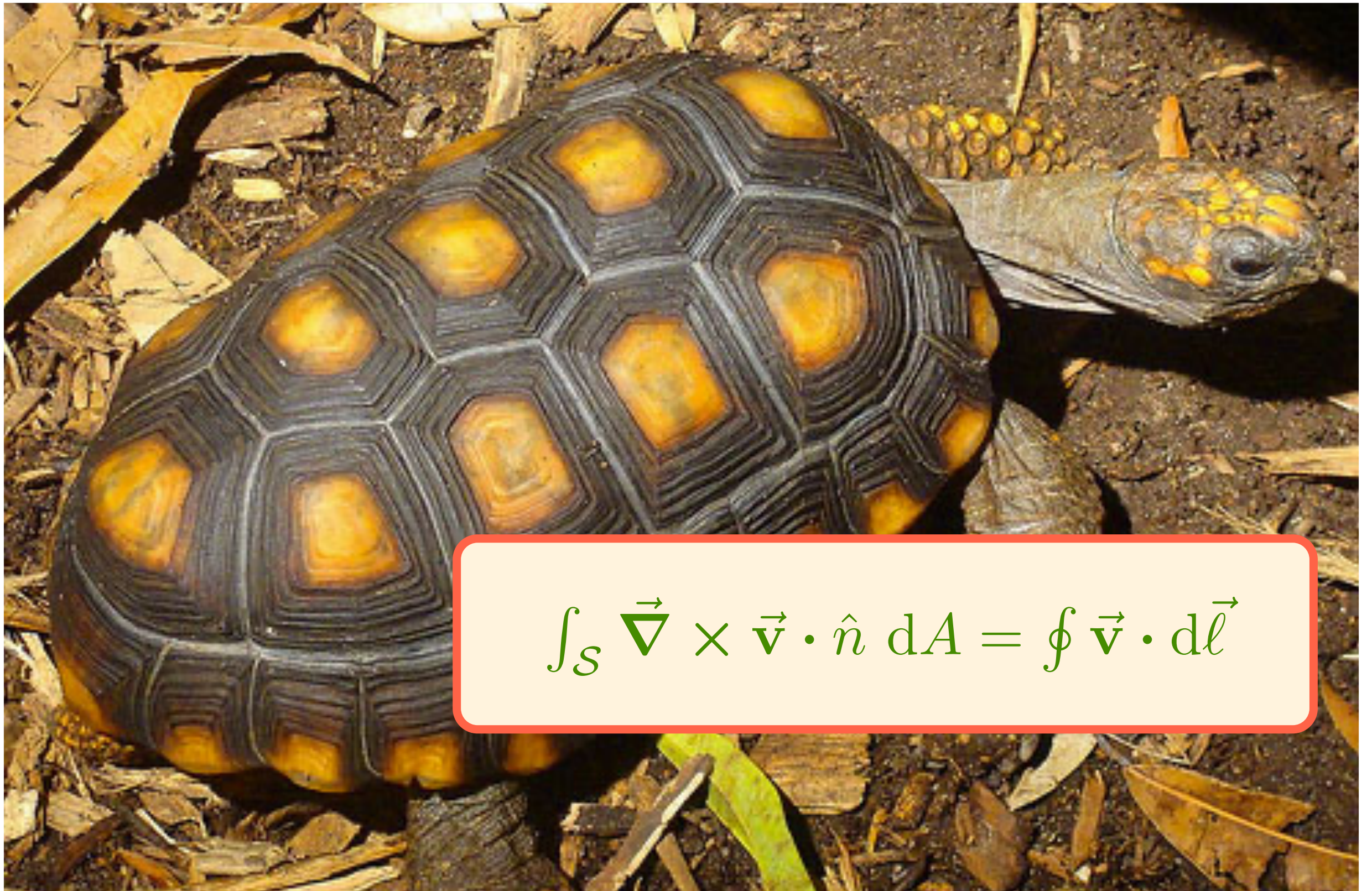
Teoremas fundamentais

$$\int_C \vec{\nabla} T \cdot d\vec{\ell} = T_b - T_a$$

$$\int_S \vec{\nabla} \times \vec{v} \cdot \hat{n} \, dA = \oint \vec{v} \cdot d\vec{\ell}$$

$$\int_V \vec{\nabla} \cdot \vec{v} \, d\tau = \int \vec{v} \cdot \hat{n} \, dA$$

Rotacional

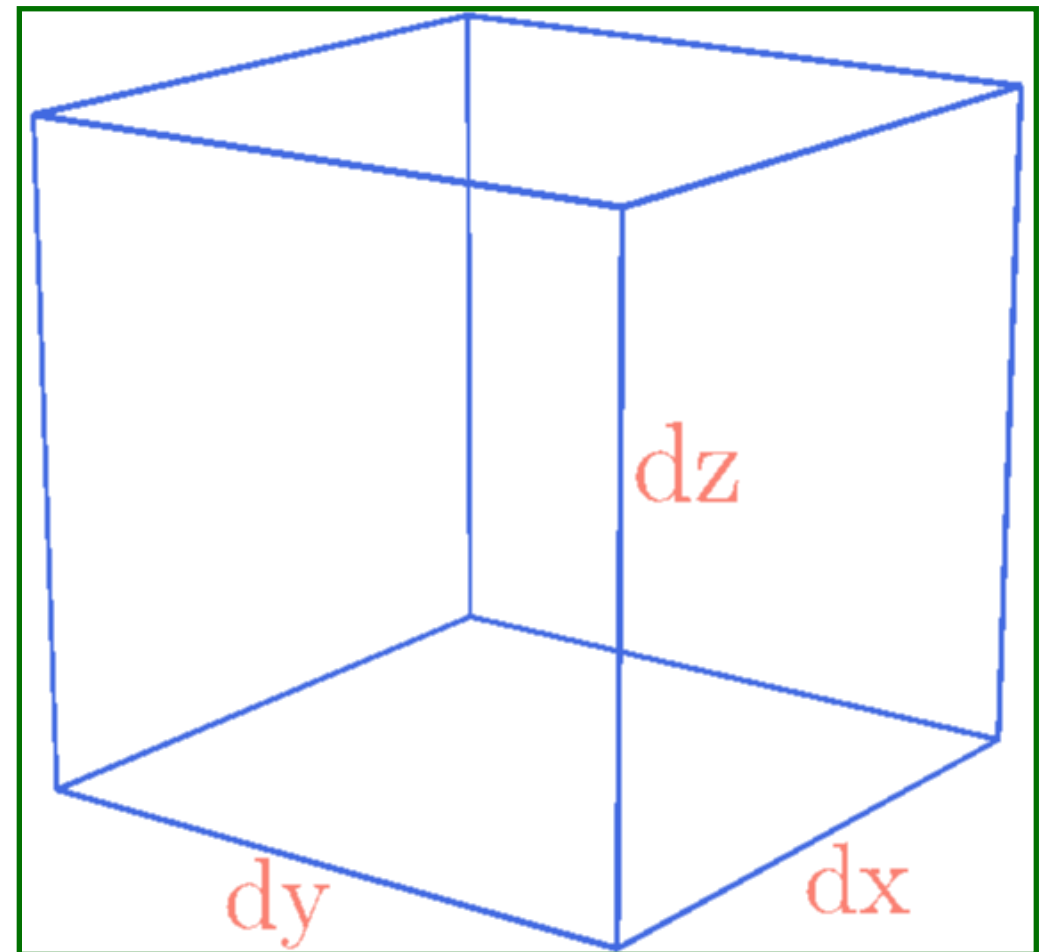


$$\int_S \vec{\nabla} \times \vec{v} \cdot \hat{n} \, dA = \oint \vec{v} \cdot d\vec{\ell}$$

Cartesianas

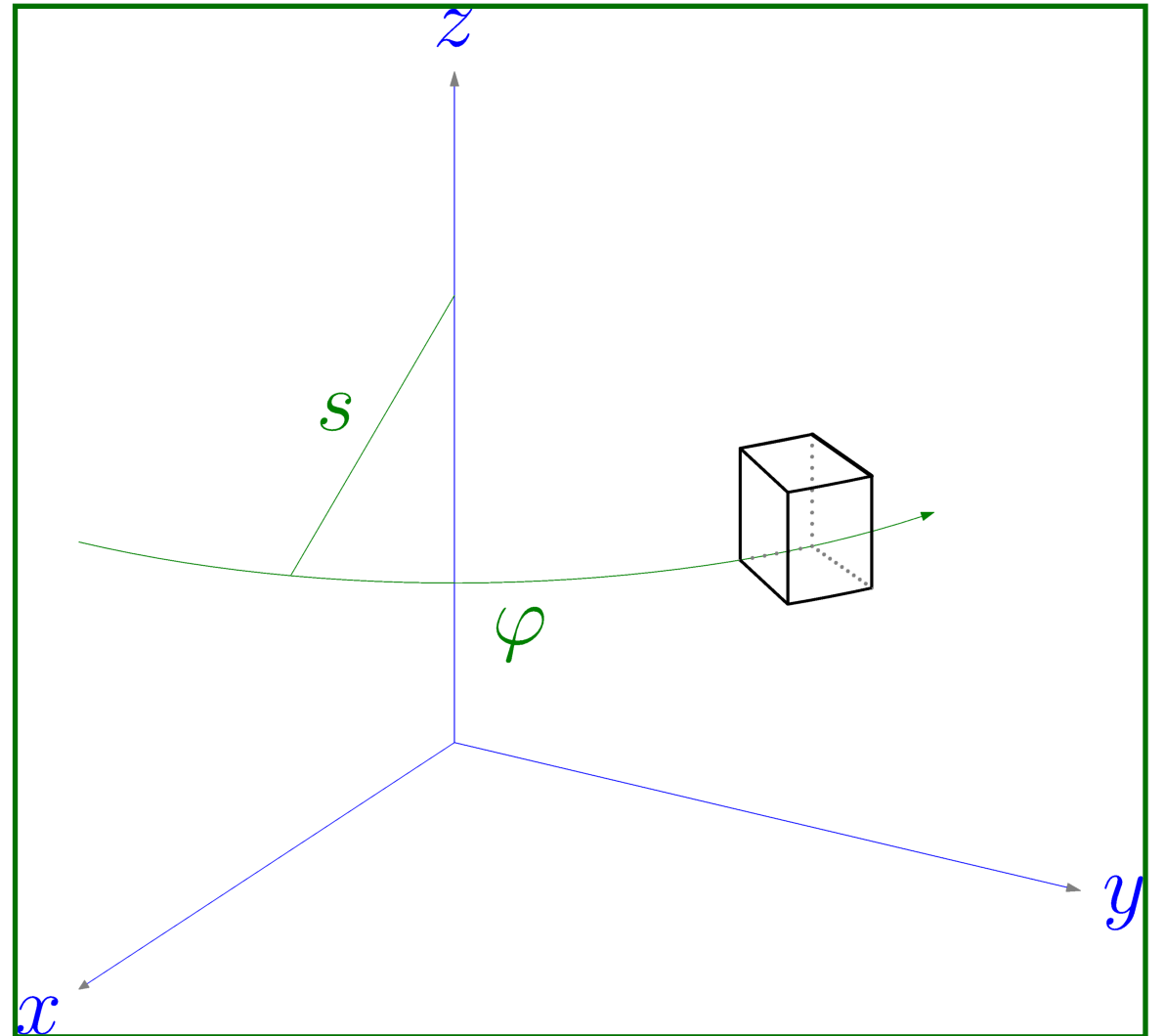
$$d\vec{\ell} = dx \hat{x} + dy \hat{y} + dz \hat{z}$$

$$\begin{aligned} \vec{\nabla} \times \vec{v} = & \left(\frac{\partial v_z}{\partial y} - \frac{\partial v_y}{\partial z} \right) \hat{x} \\ & + \left(\frac{\partial v_x}{\partial z} - \frac{\partial v_z}{\partial x} \right) \hat{y} \\ & + \left(\frac{\partial v_y}{\partial x} - \frac{\partial v_x}{\partial y} \right) \hat{z} \end{aligned}$$



Coordenadas cilíndricas

$$d\vec{\ell} = ds \hat{s} + s d\varphi \hat{\varphi} + dz \hat{z}$$



Coordenadas cilíndricas

$$d\vec{\ell} = ds \hat{s} + s d\varphi \hat{\varphi} + dz \hat{z}$$

$$\begin{aligned} \vec{\nabla} \times \vec{v} = & \left(\frac{1}{s} \frac{\partial v_z}{\partial \varphi} - \frac{\partial v_\varphi}{\partial z} \right) \hat{s} \\ & + \left(\frac{\partial v_s}{\partial z} - \frac{\partial v_z}{\partial s} \right) \hat{\varphi} \\ & + \frac{1}{s} \left(\frac{\partial (s v_\varphi)}{\partial s} - \frac{\partial v_s}{\partial \varphi} \right) \hat{z} \end{aligned}$$

