1st tutorial

Mittwoch, 25. April 2018 10:36

$$f(h) = \frac{1}{1+e^{-ah}}$$

$$\vec{j} = -\sigma \nabla \phi$$

conductivity (constant) : property of the material

$$\boxed{g' \cdot h + h' g}$$

$$= -\sigma \begin{pmatrix} \frac{\partial}{\partial x} \\ \frac{\partial}{\partial y} \\ \frac{\partial}{\partial z} \end{pmatrix} \phi \qquad (p_x \cdot x + p_y y + p_z \cdot z)$$

p

$$\phi\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \frac{1}{4\pi\epsilon_0} \cdot \frac{\begin{pmatrix} p_x \\ p_y \\ p_z \end{pmatrix} \cdot \begin{pmatrix} x \\ y \\ z \end{pmatrix}}{\underbrace{\left\| \begin{pmatrix} x \\ y \\ z \end{pmatrix} \right\|^3}_{(x^2+y^2+z^2)^{3/2}}}$$

$$\frac{\partial \phi}{\partial x} = \frac{1}{4\pi\epsilon_0} \cdot \left(p_x \cdot (x^2+y^2+z^2)^{-3/2} + \left(-\frac{3}{2}\right)(x^2+y^2+z^2)^{-\frac{5}{2}} \cdot 2x \right) (p_x x + p_y x + p_z z)$$

$$= \frac{1}{4\pi\epsilon_0} \left(\frac{p_x}{(x^2+y^2+z^2)^{3/2}} - \frac{3 \cdot (p_x x + p_y y + p_z z)}{(x^2+y^2+z^2)^{5/2}} \right) = \frac{1}{4\pi\epsilon_0} \cdot \frac{1}{(x^2+y^2+z^2)^{3/2}} \left(p_x - \frac{3\,(p_x x + p_y y + p_z z)}{(x^2+y^2+t^2)^2} \right)$$

$= - \;\; " \;\; -$

$\boxed{\text{Tensordot}}$