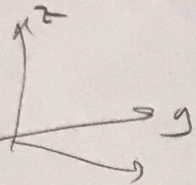
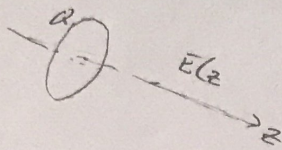


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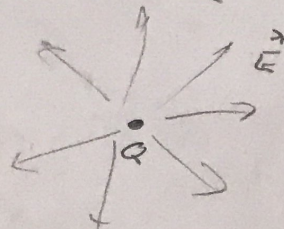
KARTESISK



SYLINDRISK



SPÆRISK



INTEGRALER

Linje $\int_L \vec{A} \cdot d\vec{l}$ $\oint_C \vec{A} \cdot d\vec{l}$

Flate

$\int_S \vec{A} \cdot d\vec{s}$

Volum

$\int_V \rho dV$

SKALARE FUNKSJONER

- høyde: $h(x, y)$
- temper: $T(x, y, z)$
 $T(x, y, z, t)$
- trykk: $P(x, y, z, t)$
- Elektrisk potensial: $V(x, y, z)$
- Ladnings tetthet: $\rho(x, y, z)$

VEKTORFELT

- elektrisk felt $\vec{E}(x, y, z, \dots, t)$
- magnetisk felt $\vec{B}(x, y, z)$
- strøm $\vec{J}(x, y, z)$
[vann, elektrisk] $\vec{I}(x, y, z)$

- Beskrive
- Integre / deriver dem
- "Noen morsomme sammenhenger mellom disse integrasjon og deriver" nyttige

GRADIENTEN

$\nabla V = \left[\frac{\partial V}{\partial x}, \frac{\partial V}{\partial y}, \frac{\partial V}{\partial z} \right]$ Vektor!

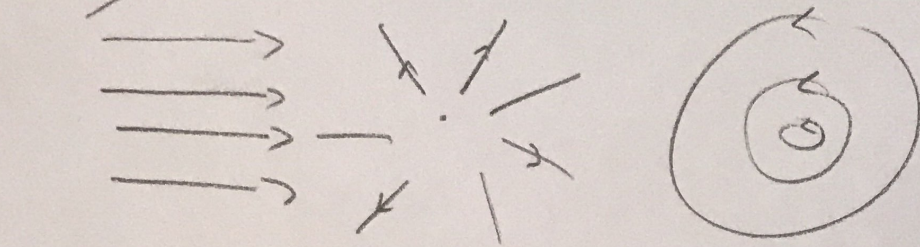
NABLAOPERATOREN: $\nabla = \left[\frac{\partial}{\partial x}, \frac{\partial}{\partial y}, \frac{\partial}{\partial z} \right]$ VEKTOR

LAPLACEOPERATOREN: $\nabla^2 = \nabla \cdot \nabla = \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}$ SKALAR

$\nabla^2 V = \frac{\partial^2 V}{\partial x^2} + \frac{\partial^2 V}{\partial y^2} + \frac{\partial^2 V}{\partial z^2}$

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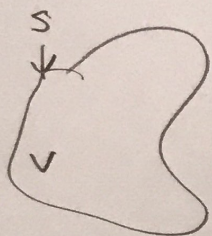
VEKTORFELT - Charakteristischer:



DIVERGENZ:

$$\operatorname{div} \vec{A} = \lim_{\Delta V \rightarrow 0} \frac{\oint \vec{A} \cdot d\vec{s}}{\Delta V} = \nabla \cdot \vec{A} \quad (\text{skalar})$$

DIVERGENZTHEOREM:

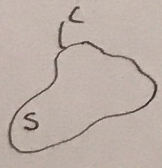


$$\oint_S \vec{A} \cdot d\vec{s} = \int_V \nabla \cdot \vec{A} \, dV$$

SIRKULATION (CURL):

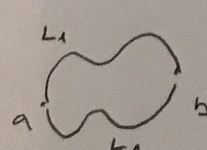
$$\operatorname{curl} \vec{A} = \lim_{\Delta S \rightarrow 0} \frac{\oint \vec{A} \cdot d\vec{e}}{\Delta S} = \nabla \times \vec{A} \quad (\text{vektor})$$

STOKES THEOREM:



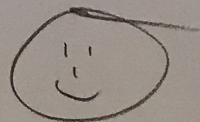
$$\oint_C \vec{A} \cdot d\vec{e} = \int_S \nabla \times \vec{A} \cdot d\vec{s}$$

KONSERVATIVES FELT

$$\vec{A} = -\nabla V \quad \int_a^b \vec{A} \cdot d\vec{e} = \int_{L_1}^b \vec{A} \cdot d\vec{e} - \int_a^{L_2} \vec{A} \cdot d\vec{e}$$


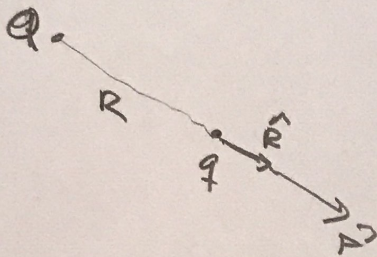
SISTE MORSUMME OPERATORRELATION:

$$\nabla^2 \vec{A} = \nabla(\nabla \cdot \vec{A}) - \nabla \times (\nabla \times \vec{A})$$



ELEKTROSTATIKK

Coulombs lov



$$\vec{F} = \frac{1}{4\pi\epsilon_0} \frac{Qq}{R^2} \hat{r}$$

ϵ_0 : Elektrisk permittivitet i vakuum

$$\epsilon_0 = 8.85 \cdot 10^{-12} \frac{C^2}{Nm^2}$$

Ladning til et elektron q_e / proton: q_p

$$q_p = -q_e = 1.6 \cdot 10^{-19} C$$