Diversens Sats

- kompakt kropp $\mathbb{R}^3$

med sluten Rand

$$\underbrace{\iint_Y}_{\text{sluten}} \vec{F}\cdot \underbrace{dS}_{\text{riktning ut?}} = \iiint_K \operatorname{div} \vec{F}\, \underbrace{dV}_{dx\,dy\,dz}$$

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underlättande förkunskap

- Centroiden av en kropp K

$\uparrow$ centrum

om K har centroid (x_c, y_c, z_c)

$$\iiint_K x\, dV = x_c \cdot \operatorname{Vol}(K)$$

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ex)

$$(x-2)^2 + y^2 + (z-3)^2 \leq 9$$

$$\vec{F}(x,y,z) = (x^2, y^2, z^2)$$

Gauss Sats

$$\iint \vec{F}\cdot d\vec{S} = \iiint \operatorname{div} \vec{F}\, dV = \iiint 2x + 2y + 2z$$

$$\oiint_Y F \cdot dS = \iiint_K \operatorname{div} F \, dV = \iiint_K 2x+2y+2z$$

Y closed

pointing out

$$(x-1)^2 + (y+1)^2 + (z-2)^2 \leq 4$$

$$\iiint_K 2x + 2y + 2z \, dx \, dy \, dy$$

$$\operatorname{Vol}(K) = \frac{4\pi 2^3}{3} = \frac{24\pi}{3} = 8\pi$$

$$\begin{cases} x = \operatorname{Vol}(K) \cdot x_c = 8\pi \cdot 1 \\ y = y_c \cdot \operatorname{Vol}(K) = -8\pi \\ z = z_c \cdot \operatorname{Vol}(K) = 8\pi \cdot 2 = 16\pi \end{cases}$$

$$2\left(\iiint_K x \, dx\,dy\,dz + \iiint_K y \, dx\,dy\,dz + \iiint_K z \, dx\,dy\,dz\right)$$

$$\Rightarrow 2(\operatorname{Vol}(K) \cdot x_c + y_c \cdot \operatorname{Vol}(K) + z_c \cdot \operatorname{Vol}(K))$$

$$= 2(8\pi - 8\pi + 16\pi) = \underline{\underline{32\pi}}$$