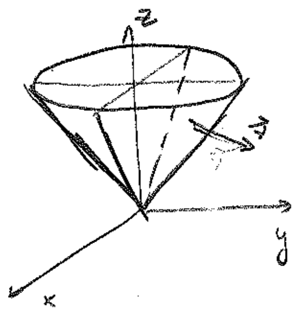
DN 49

DOLOČI PRETOK VEKTORSKEGA POLJA $\vec{a}$ SKOZI DANO PLOSKEV $\vec{P}$

(a $\vec{a} = (e^z(y^2+z^2),\ x^2 + e^{z^2}(z^2+x^4)\ ,1)$

$\vec{P}$ JE ZUNANJA STRAN PLAŠČA STOŽCA

$P = \{(x,y,z) \in \mathbb{R}^3 \ ;\ x^2+y^2 = z^2 \ ,\ 0 \le z \le h\}$



PLAŠČ STOŽCA DOPOLNIMO Z „POKROVOM" $\vec{D} = (D, \vec{\nu}_D)$

$D = \{(x,y,z) \in \mathbb{R}^3 \ ;\ x^2+y^2 \le h^2 \ ,\ z = h\}$

$\vec{\nu}_D = (0,0,1)$;

UPORABIMO GAUSSOV DIVERGENČNI IZREK:

$$\left.\begin{aligned}
&\oiint_{+\partial\vec{G}} \vec{a}\,d\vec{S} = \iiint_G \operatorname{div}\vec{a}\,dV \\
&\operatorname{div}\vec{a} = 0 \\
&G = \{(x,y,z) \in \mathbb{R}^3 \ ;\ x^2+y^2 \le z^2 \ ,\ 0 \le z \le h\} \\
&+\partial\vec{G} = \vec{P} + \vec{D}
\end{aligned}\right\} \Rightarrow$$

$$\oiint_{\vec{P}+\vec{D}} \vec{a}\,d\vec{S} = 0 \Rightarrow \iint_{\vec{P}} \vec{a}\,d\vec{S} = -\oiint_{\vec{D}} \vec{a}\,d\vec{S} =$$

$$(\vec{a} \circ \vec{f})(x,y) = \vec{a}(x, y, h) = (\underline{\quad}, \underline{\quad}, 1)$$

TI DVE KOMPONENTI NAS NE ZANIMATA, KER JE $\vec{\nu}_D = (0,0,1)$

$$= -\iint_D (\underline{\quad}, \underline{\quad}, 1)(0,0,1)\,dx\,dy$$

$$= -\,\text{pl}\,(D) = \underline{-\pi h^2}$$