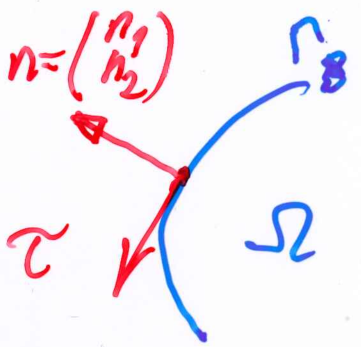
Folie 44 c)

- **Boundary Conditions:**

$$\Gamma_B: \; 0 = B \cdot n = \begin{pmatrix} \partial_2 A_3 \\ -\partial_1 A_3 \\ 0 \end{pmatrix} \cdot \begin{pmatrix} n_1 \\ n_2 \\ 0 \end{pmatrix} =$$



$$= \partial_2 A_3 \cdot n_1 - \partial_1 A_3 n_2$$

$$= \nabla A_3 \times \begin{pmatrix} n_1 \\ n_2 \end{pmatrix} = \frac{\partial}{\partial \tau} A_3 = 0$$

e.g., $A_3 = 0$ on Γ_B

$$\Gamma_H: \; \begin{pmatrix} 0 \\ 0 \\ -J_{s,3} \end{pmatrix} = [\nu(|\nabla \times A|)\, \nabla \times A] \times n$$

$$= \nu(|\nabla A_3|) \begin{pmatrix} \partial_2 A_3 \\ -\partial_1 A_3 \\ 0 \end{pmatrix} \times \begin{pmatrix} n_1 \\ n_2 \\ 0 \end{pmatrix}$$

$$= \nu(|\nabla A_3|) \begin{pmatrix} 0 \\ 0 \\ \partial_2 A_3 n_2 + \partial_1 A_3 n_1 \end{pmatrix}$$

- **Result:** 3d Magnetostatic $\rightarrow$ 2d Magnetostatic

Find $u = A_3$ such that

„1 where $H_0 \neq 0$"

$$-\operatorname{div}(\nu(x, |\nabla u|)\, \nabla u(x)) = J_3(x) + \frac{\mu_0}{\mu} \left(\frac{\partial H_{02}}{\partial x_1} - \frac{\partial H_{01}}{\partial x_2} \right),$$

$$x = (x_1, x_2) \in \Omega \subset \mathbb{R}^2,$$

$$\operatorname{supp} H_0 \subset\subset \Omega,$$

+ BC: $u = 0$ on $\Gamma_D = \Gamma_B$,

$\nu(|\nabla u|)\, \nabla u \cdot n = -J_{s,3}$ on $\Gamma_N = \Gamma_H$.