

# GLEIT 2

## Selbststudium - Felder - C19

geg.: - Zylinder ( $h=0,1\text{m}$ )

-  $r_a = 60\text{mm}$

-  $r_i = 20\text{mm}$

-  $\gamma_1 = 20\text{ S/m}$

-  $\gamma_2 = 100\text{ S/m}$

> jeweilige Dicke 20mm

ges.:  $I$ , Potenzial bei  $U = 10\text{mV}$ , Wo max Leistungsdichte

$$p = \frac{1}{R}$$

$$A = 2\pi r h$$

$$R = p \cdot A \hat{=} \frac{1}{\gamma} \cdot \frac{L}{A}$$

$$\vec{R} = \int d\vec{R} \Rightarrow R = \int dR(r)$$

parallel

$$R = \int \frac{1}{\gamma} \cdot \frac{dr}{A} = \int \frac{1}{\gamma \cdot 2\pi \cdot h} \cdot \int \frac{dr}{r}$$

$$R = \frac{1}{\gamma \cdot 2\pi \cdot h} \cdot \ln\left(\frac{r_i}{r_a}\right)$$

$$R_1 = \frac{1}{20 \cdot 2\pi \cdot 0,1} \cdot \ln\left(\frac{40}{20}\right) = 0,055158 \Omega \hat{=} \underline{\underline{55,158\text{m}\Omega}}$$

$$R_2 = \frac{1}{100 \cdot 2\pi \cdot 0,1} \cdot \ln\left(\frac{60}{40}\right) = 0,006453 \Omega \hat{=} \underline{\underline{6,453\text{m}\Omega}}$$

$$R_{\text{ges}} = R_1 + R_2 = \underline{\underline{61,611\text{m}\Omega}}$$

$$I = \frac{U}{R_{\text{ges}}} = 0,162308\text{A} \hat{=} \underline{\underline{162,308\text{mA}}}$$

$$U_{\text{gr}} = U \cdot \frac{R_1}{R_1 + R_2} = \underline{\underline{8,9526\text{mV}}}$$

Leistungsdichte  $S = j \cdot E = \frac{j^2}{\gamma}$

$$j_{\text{innen}} = \frac{I}{A} = \frac{162,308}{2\pi \cdot 20 \cdot 100} = 12,916 \frac{\text{A}}{\text{m}^2}$$

$$j_{\text{außen}} = \frac{I}{A} = \frac{162,308}{2\pi \cdot 40 \cdot 100} = 6,458 \frac{\text{A}}{\text{m}^2}$$

$$S_{\text{innen}} = \frac{j_{\text{innen}}^2}{\gamma_1} = \underline{\underline{8,341 \frac{\text{W}}{\text{m}^2}}}$$

$$S_{\text{außen}} = \frac{j_{\text{außen}}^2}{\gamma_2} = \underline{\underline{0,416 \frac{\text{W}}{\text{m}^2}}}$$