Aufgabe 2

c) gesucht: Vergleichsumformgrad nach von Mises

$$\varphi_v = \sqrt{\frac{2}{3}\left(\varphi_x^2 + \varphi_y^2 + \varphi_z^2\right)}$$

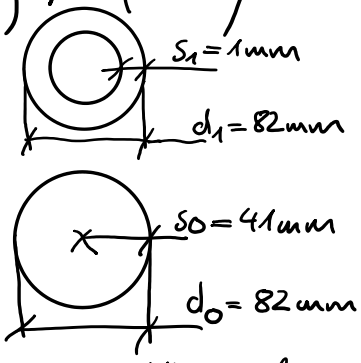
φ_r (radial) φ_t (tangential) φ_z (axial)

① radial

$$\varphi_r = \ln \frac{s_1}{s_0} \qquad s_1 = 1\,mm \qquad s_0 = 41\,mm$$

$$\varphi_r = \ln\left(\frac{1\,mm}{41\,mm}\right)$$

$$\varphi_r = -3{,}7$$



Wandstärke ≙ Radius

② tangential

$$\varphi_t = \ln \frac{U_{m1}}{U_{m0}}$$

$$U_{m0} = \pi \cdot \frac{d_0}{2} = \pi \cdot \frac{82\,mm}{2} = 128{,}8\,mm$$

$$\varphi_t = \ln\left(\frac{254{,}5\,mm}{128{,}8\,mm}\right)$$

$$U_{m1} = \pi \cdot (d_1 - s_1) = \pi \cdot (82\,mm - 1\,mm) = 254{,}5\,mm$$

$$\varphi_t = 0{,}68$$

③ axial

$$\varphi_z = \ln\left(\frac{u_1}{u_0}\right)$$

$$\varphi_z = \ln\left(\frac{366\,mm}{18{,}58\,mm}\right)$$

$$\varphi_z = 2{,}98$$

$$\varphi_v = \sqrt{\frac{2}{3}\left((-3{,}7)^2 + (0{,}68)^2 + (2{,}98)^2\right)}$$

$$\varphi_v = 3{,}9$$