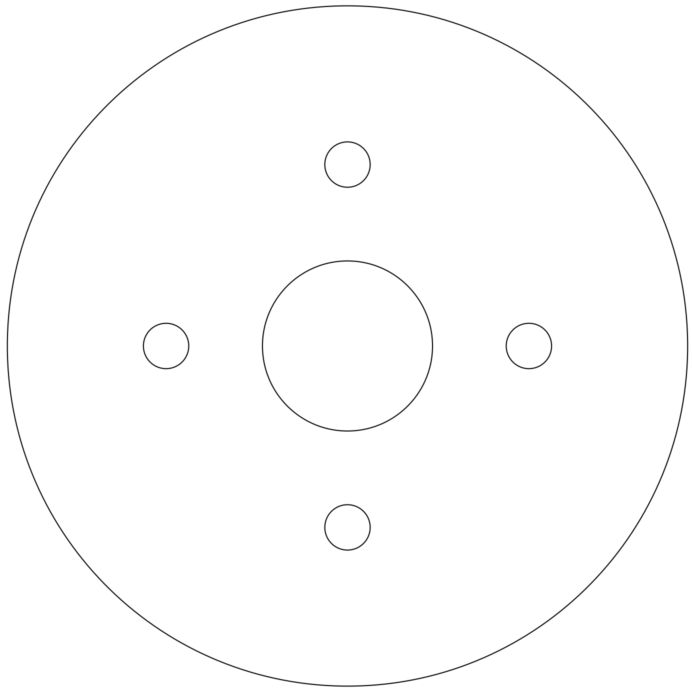


$$u_r = C_1 r + \frac{C_2}{r} - \frac{1-v^2}{8E}\varrho\omega^2 r^3 + (1+v)\frac{\alpha}{r}\int_a^r r'\Delta T dr'$$
$$\sigma_r = \frac{E}{1-v}C_1 - \frac{E}{(1+v)r^2}C_2 - \frac{3+v}{8}\varrho\omega^2 r^2 + \frac{E\alpha}{r^2}\int_a^r r'\Delta T dr'$$
$$\sigma_\varphi = \frac{E}{1-v}C_1 + \frac{E}{(1+v)r^2}C_2 - \frac{1+3v}{8}\varrho\omega^2 r^2 + E\alpha(\Delta T - \frac{1}{r^2}\int_a^r r'\Delta T dr')$$

Aus $\omega = 0$ und $\Delta T = 0$ folgt:

$$u_r = C_1 r + \frac{C_2}{r}$$
$$\sigma_r = \frac{E}{1-v}C_1 - \frac{E}{(1+v)r^2}C_2$$
$$\sigma_\varphi = \frac{E}{1-v}C_1 + \frac{E}{(1+v)r^2}C_2$$

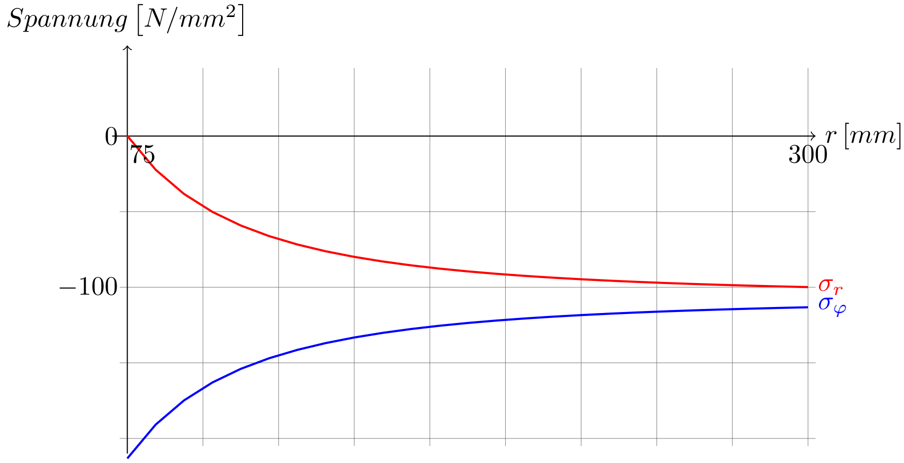
Gegeben sind $\sigma_r(r_1) = \sigma_1$ und $\sigma_r(r_2) = \sigma_2$. Damit kann man C_1 und C_2 herleiten:

$$C_1 = (1-v)\left(\frac{\sigma_2}{E} + \frac{C_2}{(1+v)r_2^2}\right)$$
$$C_2 = \frac{(\sigma_1 - \sigma_2)r_1^2 r_2^2(1+v)}{E(r_1^2 - r_2^2)}$$

Mit $\sigma_1 = -100 N/mm^2$ und $\sigma_2 = 0 N/mm^2$ folgt:

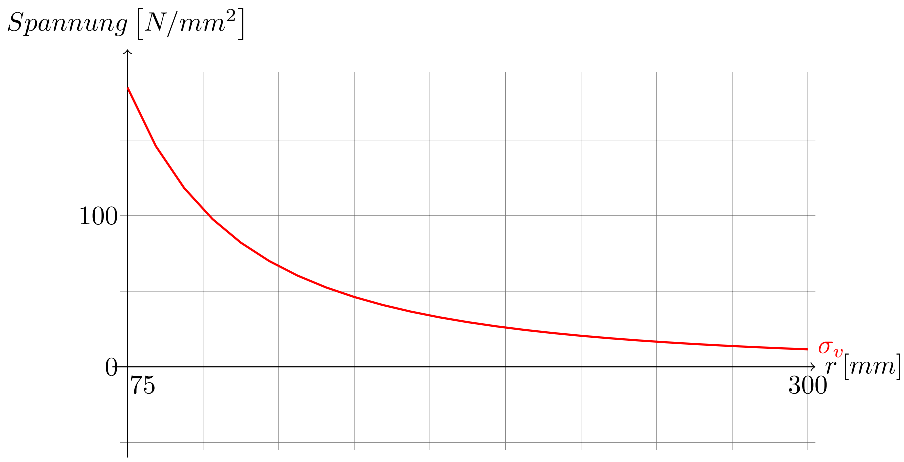
$$C_1 \approx -3,73 \cdot 10^{-4}$$
$$C_2 = -3,9 mm^2$$

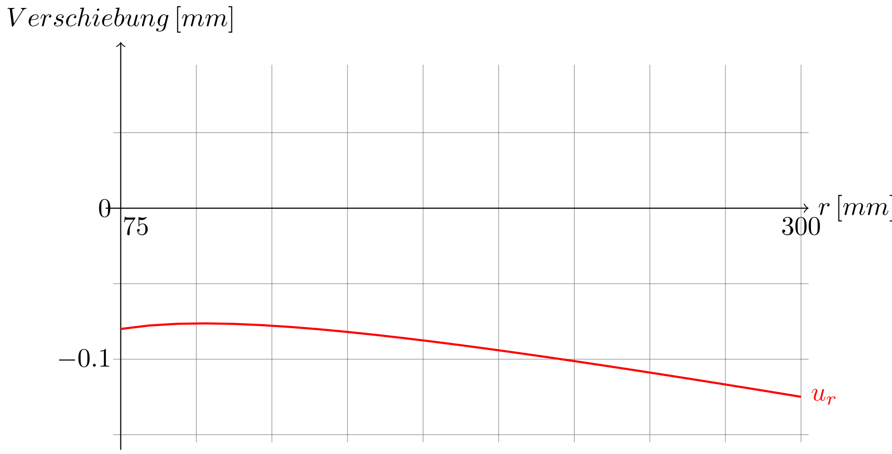
Tangetial- und Radialspannung



Vergleichsspannung

$$\sigma_v = \sqrt{\sigma_r^2 + \sigma_\varphi^2 + \sigma_t^2 - \sigma_r\sigma_\varphi - \sigma_t\sigma_\varphi - \sigma_r\sigma_t}$$




$Verschiebung\,[mm]$
0
75
300
$r\,[mm]$
-0.1
u_r