LS1, Version A.

Beräkna dubbelintegralen

$$I = \iint_D (x^2 + y^2)\,dxdy$$

$$D = \left\{(x, y) : 4 \le x^2 + y^2 \le 9,\ \ 0 \le x \le y\right\}$$

$$\begin{cases} x = r\cos\varphi \\ y = r\sin\varphi \end{cases}$$

$$dxdy = rdrd\varphi$$

$$D_{r\theta} = \left\{(r,\theta) : 2 \le r \le 3,\ \frac{\pi}{4} \le \theta \le \frac{\pi}{2}\right\}$$

$$I = \iint_{D_{r\theta}} r^2 \, r\,dr\,d\theta$$

$$I = \left(\frac{\pi}{2} - \frac{\pi}{4}\right) \int_{r=2}^{3} r^3 dr = \frac{\pi}{4}\,\frac{3^4 - 2^4}{4} = \frac{\pi}{4}\,\frac{81 - 16}{4} = \frac{65\pi}{16}$$