

Vypočítejte plošné integrály:

$$(1) \quad \iint_{\mathcal{P}} \frac{xy}{\sqrt{4z+1}} dS \quad \iint_{\mathcal{P}} (-y, x, xyz) d\vec{S} \quad \mathcal{P} : \begin{array}{l} x = u \cos v \\ y = u \sin v \\ z = u^2 \end{array} \quad u \in \langle 0, 1 \rangle \quad v \in \langle 0, \frac{\pi}{2} \rangle \quad \blacktriangleright \quad \frac{1}{8} \quad \frac{1}{12}$$

$$(2) \quad \iint_{\mathcal{P}} \frac{12}{z} \sqrt{x^2 + y^2} dS \quad \iint_{\mathcal{P}} (y, -x, z^2) d\vec{S} \quad \mathcal{P} : \begin{array}{l} x = u \cos v \\ y = u \sin v \\ z = \sqrt{u} \end{array} \quad u \in \langle 0, 1 \rangle \quad v \in \langle 0, \frac{\pi}{2} \rangle \quad \blacktriangleright \quad \frac{\pi}{20}(25\sqrt{5} + 1) \quad \frac{\pi}{6}$$

$$(3) \quad \iint_{\mathcal{P}} xz dS \quad \mathcal{P} : \begin{array}{l} x = \frac{1}{2}u \cos v \\ y = \frac{1}{2}u \sin v \\ z = \frac{\sqrt{3}}{2}u \end{array} \quad u \in \langle 0, 2 \rangle \quad v \in \langle 0, \frac{\pi}{2} \rangle \quad \blacktriangleright \quad \frac{\sqrt{3}}{2}$$

$$(4) \quad \iint_{\mathcal{P}} xz dS \quad \mathcal{P} : \begin{array}{l} x = 2u \cos v \\ y = 2u \sin v \\ z = 2 \cos v \end{array} \quad u, v \in \langle 0, \frac{\pi}{2} \rangle \quad \blacktriangleright \quad \frac{16}{3}$$

$$(5) \quad \iint_{\mathcal{P}} (y - z, z - x, x - y) d\vec{S} \quad \mathcal{P} : \begin{array}{l} x = \frac{\sqrt{2}}{2}u \cos v \\ y = \frac{\sqrt{2}}{2}u \sin v \\ z = \frac{\sqrt{2}}{2}u \end{array} \quad u \in \langle 0, 3 \rangle \quad v \in \langle 0, \pi \rangle \quad \blacktriangleright \quad -9\sqrt{2}$$

Ověrte Stokesovu větu pro funkci \vec{f} a plochu \mathcal{P} :

$$(6) \quad \vec{f}(x, y, z) = (x \ln z, y \ln z, xy) \quad \mathcal{P} : \begin{array}{l} x = u \\ y = v \\ z = uv \end{array} \quad u \in \langle 1, 2 \rangle \quad v \in \langle 1, 3 \rangle \quad \blacktriangleright \quad 4 \ln 2 - \frac{3}{2} \ln 3$$