da cui:

$$\int_{\Sigma} \vec{F} \cdot \nu_{ext}\, d\Sigma = 4 \iiint_D z\, dx\, dy\, dz +$$

$$+ \int_{\Sigma_x} \cancel{(x + x(y - z^2))}^{0} d\Sigma + \int_{\Sigma_y} \cancel{(2y + y(z^2 + x))}^{0} d\Sigma$$

$$+ \int_{\Sigma_z} \cancel{(3z + z(2z - y - x))}^{0} d\Sigma = 4 \iiint_D z\, dx\, dy\, dz$$

$$= 4 \int_0^2 z\, dz \iint_{\{(x,y,z):\, 4x^2 + y^2 \le 4 - z^2\}} dx\, dy = 4 \int_0^2 z \frac{\pi}{4} \sqrt{\frac{4 - z^2}{4}} \sqrt{4 - z^2}\, dz$$

$$= \frac{\pi}{2} \int_0^2 z(4 - z^2)\, dz = \frac{\pi}{4} \int_0^4 (4 - t^2)\, dt =$$

$$= \frac{\pi}{4} \left[4t - \frac{t^3}{3} \right]_0^4 = \frac{\pi}{4} \left(4^2 - \frac{4^3}{3} \right) = 4\pi \left(1 - \frac{4}{3} \right) =$$

$$= -\frac{4}{3}\pi$$