

Proposed problem to Mathematical Reflections

Evaluate

$$\iiint_D e^{\sqrt{x^2+y^2}/2} \frac{zy^2}{(x^2+y^2)^{\frac{3}{2}}} \frac{(\frac{1}{2}(x^2+y^2+z^2)-1)^3}{\sqrt{4-x^2-y^2-z^2}} \frac{dx\,dy\,dz}{\sqrt{x^2+y^2+z^2}}$$

$$D = \{(z-1)^2 + y^2 + x^2 \leq 1\}$$