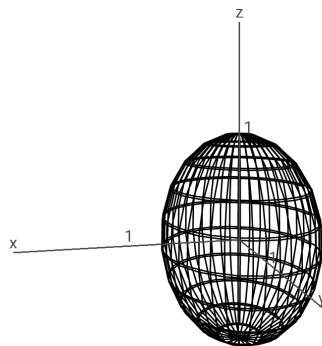


Encontre a área do elipsoide obtido pela rotação ao redor do eixo x da elipse $2x^2 + y^2 = 1$.

Resolução:



$$y = \sqrt{1 - 2x^2}, y' = -\frac{x}{\sqrt{1 - 2x^2}}$$

$$A = 2\pi \int_{-1/\sqrt{2}}^{1/\sqrt{2}} \sqrt{1 - 2x^2} \sqrt{1 + \frac{x^2}{1 - 2x^2}} dx = 2\pi \int_{-1/\sqrt{2}}^{1/\sqrt{2}} \sqrt{1 - x^2} dx$$

$$\text{Seja } x = \sin \theta, \theta \in [-\frac{\pi}{2}, \frac{\pi}{2}], dx = \cos \theta d\theta.$$

$$A = \pi \int_{-\pi/4}^{\pi/4} \cos 2\theta + 1 d\theta = \pi \left(\frac{\sin 2\theta}{2} + \theta \right) \Big|_{-\pi/4}^{\pi/4} = \boxed{\pi \left(1 + \frac{\pi}{2} \right)}$$

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