Aula 19 - 15.8 /25

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- $\begin{cases} x = \rho \cdot \operatorname{sen}\phi \cdot \cos\theta \\ y = \rho \cdot \operatorname{sen}\phi \cdot \operatorname{sen}\theta \\ z = \rho \cdot \cos\phi \end{cases}$ $\qquad x^2 + y^2 + z^2 = \rho^2$

- $\int_0^{\pi/2} \int_0^{\pi/2} \int_0^{1} \rho \cdot \operatorname{sen}\phi \cdot \cos\theta \, e^{\rho^2} \cdot \rho^2 \operatorname{sen}\phi \; d\rho d\theta d\phi$

- $\int_0^{\pi/2} \int_0^{\pi/2} \int_0^{1} e^{\rho^2} \cdot \rho^3 \cdot \operatorname{sen}^2\phi \cdot \cos\theta \, d\rho d\theta d\phi$

- $\int_0^{\pi/2} \operatorname{sen}^2\phi \, d\phi \int_0^{\pi/2} \cos\theta \, d\theta \int_0^{1} \rho^3 \cdot e^{\rho^2} \, d\rho$

- $\operatorname{sen}^2 x = (1 - \cos 2x)/2$

$$\int_0^{\pi/2} \frac{1}{2}(1 - \cos 2\phi)\, d\phi \int_0^{\pi/2} \cos(\theta)\, d\theta \int_0^{1} e^{\rho^2} \rho^3 \, d\rho$$

- $\left[\frac{1}{2}\phi - \frac{1}{4}\operatorname{sen} 2\phi\right]_0^{\pi/2} \left[\operatorname{sen}\theta\right]_0^{\pi/2} \left[-\frac{1}{2} \cdot e^{\rho^2} + \frac{1}{2} \cdot \rho^2 \cdot e^{\rho^2}\right]_0^{1}$

- $\left[\frac{\pi}{4} - 0\right] \cdot \left[1 - 0\right] \cdot \left[-\frac{1}{2}e + \frac{1}{2}e - \left(-\frac{1}{2}\right) + 0\right] = \left(\frac{\pi}{4}\right) \cdot (1) \cdot \left(\frac{1}{2}\right)$

$$\iiint x \cdot e^{x^2+y^2+z^2} \, dV = \frac{\pi}{8}$$