

Resolución TP7:

Ejercicio 17-c

Resolver la integral triple I con el recinto V.

$$V: [-1,1] \times [-1,1] \times [-1,1]$$

$$I = \iiint_V xyze^{x^2+y^2+z^2} dx dy dz$$

$$I = \int_{-1}^1 \int_{-1}^1 \int_{-1}^1 xyze^{x^2+y^2+z^2} dx dy dz$$

$$I = \int_{-1}^1 \int_{-1}^1 \int_{-1}^1 xyze^{x^2} e^{y^2} e^{z^2} dx dy dz$$

$$I = \int_{-1}^1 xe^{x^2} dx \int_{-1}^1 ye^{y^2} dy \int_{-1}^1 ze^{z^2} dz$$

$$\text{sustitucion } x^2 = t \rightarrow 2x dx = dt \rightarrow x dx = \frac{dt}{2}$$

$$I = \int_{x=-1}^{x=1} \frac{e^t dt}{2} \int_{y=-1}^{y=1} \frac{e^t dt}{2} \int_{z=-1}^{z=1} \frac{e^t dt}{2}$$

$$I = \frac{1}{8} [e^t]_{x=-1}^{x=1} [e^t]_{y=-1}^{y=1} [e^t]_{z=-1}^{z=1}$$

$$I = \frac{1}{8} [e^{x^2}]_{x=-1}^{x=1} [e^{y^2}]_{y=-1}^{y=1} [e^{z^2}]_{z=-1}^{z=1}$$

$$I = \frac{1}{8} [e^1 - e^1] [e^1 - e^1] [e^1 - e^1] = 0$$