

Fórmula de Dirichlet

$$R = \left\{ (x, y, z) \in \mathbb{R}^3 \mid \left(\frac{x}{a}\right)^\alpha + \left(\frac{y}{b}\right)^\beta + \left(\frac{z}{c}\right)^\gamma \leq 1; x, y, z \geq 0 \right\}$$

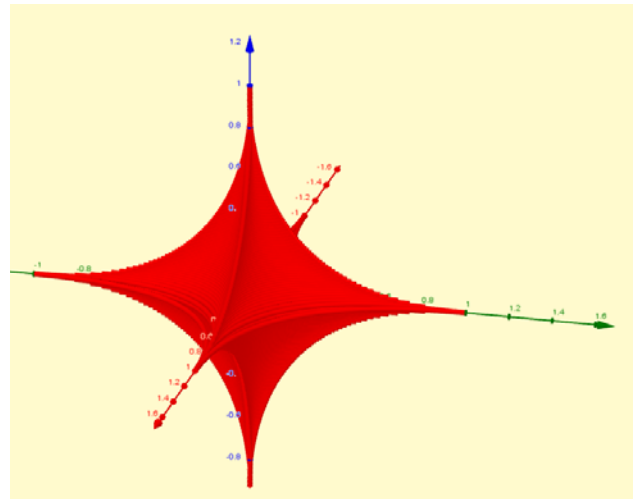
$$I_R = \iiint_R x^{p-1} y^{q-1} z^{r-1} dx dy dz = \frac{a^p b^q c^r}{\alpha \beta \gamma} \frac{\Gamma\left(\frac{p}{\alpha}\right) \Gamma\left(\frac{q}{\beta}\right) \Gamma\left(\frac{r}{\gamma}\right)}{\Gamma\left(\frac{p}{\alpha} + \frac{q}{\beta} + \frac{r}{\gamma} + 1\right)}, \quad \Gamma(p) = (p-1)!$$

Ejemplo:

$$R = \left\{ (x, y, z) \in \mathbb{R}^3 \mid \sqrt{|x|} + \sqrt{|y|} + \sqrt{|z|} \leq a \right\}$$

$$\alpha = \beta = \gamma = \frac{1}{2}, \quad a = b = c, \quad p = q = r = 1$$

$$V_R = 8 \frac{a^3}{\left(\frac{1}{2}\right)^3} \frac{(\Gamma(2))^3}{\Gamma(3 \cdot 2 + 1)} = \frac{4}{45} a^3$$



Tomado de: Pedro Puig Adam, *Calculo Integral*. Lección 24, nota § 10 (pg. 225)