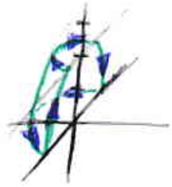
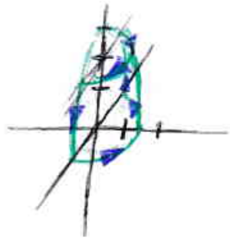
Para ello tenemos que fragmentar ∂V en varias superficies paramatrizadas con borde a las que aplicar el Teorema de Stokes.

Consideramos entonces

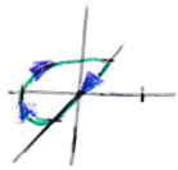
$$A = \{(x,y,z) \in \mathbb{R}^3 \mid z = 3 - x^2 - y^2,\ z \in (0,2),\ y < 0\}$$



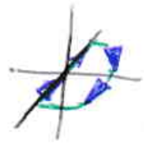
$$B = \{(x,y,z) \in \mathbb{R}^3 \mid z = 3 - x^2 - y^2,\ z \in (0,2),\ y > 0\}$$



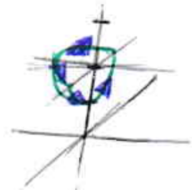
$$C = \{(x,y,z) \in \mathbb{R}^3 \mid x^2 + y^2 < 3,\ y < 0,\ z = 0\}$$



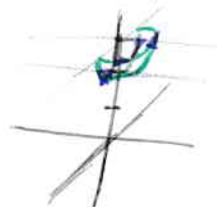
$$D = \{(x,y,z) \in \mathbb{R}^3 \mid x^2 + y^2 < 3,\ y > 0,\ z = 0\}$$



$$E = \{(x,y,z) \in \mathbb{R}^3 \mid x^2 + y^2 + (z-2)^2 = 1,\ z < 2,\ y < 0\}$$



$$F = \{(x,y,z) \in \mathbb{R}^3 \mid x^2 + y^2 + (z-2)^2 = 1,\ z < 2,\ y > 0\}$$



$$I_2 = \iint_{\partial V} \mathrm{rot}(\vec{F}) \cdot d\vec{S} = \iint_A \mathrm{rot}(\vec{F}) \cdot d\vec{S} + \iint_B \mathrm{rot}(\vec{F}) \cdot d\vec{S} + \iint_C \mathrm{rot}(\vec{F}) \cdot d\vec{S} +$$

$$+ \iint_D \mathrm{rot}(\vec{F}) \cdot d\vec{S} + \iint_E \mathrm{rot}(\vec{F}) \cdot d\vec{S} + \iint_F \mathrm{rot}(\vec{F}) \cdot d\vec{S} =$$

$$= \int_{\partial A} \vec{F} \cdot d\vec{s} + \int_{\partial B} \vec{F} \cdot d\vec{s} + \int_{\partial C} \vec{F} \cdot d\vec{s} + \int_{\partial D} \vec{F} \cdot d\vec{s} + \int_{\partial E} \vec{F} \cdot d\vec{s} + \int_{\partial F} \vec{F} \cdot d\vec{s}.$$