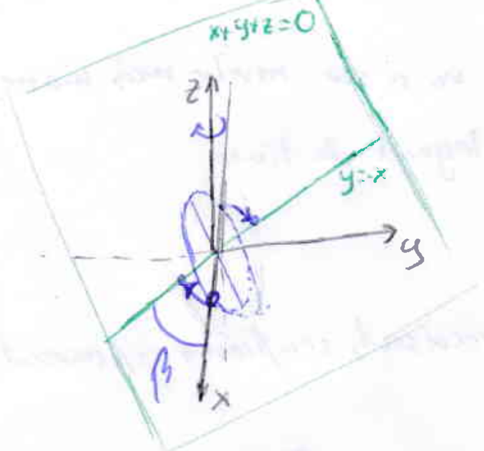

Como la rotación es en sentido horario entonces $\beta = -\frac{\pi}{4}$

$\cos\beta = \frac{\sqrt{2}}{2} \qquad \operatorname{sen}\beta = -\frac{\sqrt{2}}{2}$

$\operatorname{sen}\alpha = -\sqrt{\frac{2}{3}} \qquad \cos\alpha = \frac{1}{\sqrt{3}}$

Por tanto

$$\Phi_2 : (0,2\pi) \longrightarrow \mathbb{R}^3$$
$$t \longrightarrow \left(a\left(\frac{\sqrt{2}}{2}\cos t - \left(-\frac{\sqrt{2}}{2}\right)\frac{1}{\sqrt{3}}\operatorname{sen} t\right),\ a\left(-\frac{\sqrt{2}}{2}\cos t + \frac{\sqrt{2}}{2}\frac{1}{\sqrt{3}}\operatorname{sen} t\right),\ a\left(-\sqrt{\frac{2}{3}}\operatorname{sen} t\right) \right)$$

$$\Phi_2(t) = \left(\frac{a}{\sqrt{2}}\cos t + \frac{a}{\sqrt{6}}\operatorname{sen} t,\ \frac{a}{\sqrt{6}}\operatorname{sen} t - \frac{a}{\sqrt{2}}\cos t,\ -a\sqrt{\frac{2}{3}}\operatorname{sen} t \right)$$

Por construcción si $D = (0,2\pi) \Rightarrow \Phi_2(D) = C \setminus \{(\frac{a}{\sqrt{2}}, -\frac{a}{\sqrt{2}}, 0)\}$

Esta parametrización es de clase C^1, es inyectiva y es mucho más sencilla que la dada en primer lugar.

$$\Phi_2'(t) = \left(-\frac{a}{\sqrt{2}}\operatorname{sen} t + \frac{a}{\sqrt{6}}\cos t,\ \frac{a}{\sqrt{6}}\cos t + \frac{a}{\sqrt{2}}\operatorname{sen} t,\ -a\sqrt{\frac{2}{3}}\cos t \right)$$

y $\displaystyle\int_C y\,dx + z\,dy + x\,dz = \int_D (\vec{F}\circ\Phi_2)\cdot\Phi_2'(t)\,dt =$

$$= \int_0^{2\pi} \left(\frac{a}{\sqrt{6}}\operatorname{sen} t - \frac{a}{\sqrt{2}}\cos t,\ -a\sqrt{\frac{2}{3}}\operatorname{sen} t,\ \frac{a}{\sqrt{2}}\cos t + \frac{a}{\sqrt{6}}\operatorname{sen} t\right)\cdot\left(-\frac{a}{\sqrt{2}}\operatorname{sen} t + \frac{a}{\sqrt{6}}\cos t,\ \frac{a\cos t}{\sqrt{6}} + \frac{a}{\sqrt{2}}\operatorname{sen} t,\ -a\sqrt{\frac{2}{3}}\cos t\right)dt$$

$$= \underbrace{\int_0^{2\pi}\left(\frac{a}{\sqrt{6}}\operatorname{sen} t - \frac{a}{\sqrt{2}}\cos t\right)\left(-\frac{a}{\sqrt{2}}\operatorname{sen} t + \frac{a}{\sqrt{6}}\cos t\right)dt}_{I_1} + \underbrace{\int_0^{2\pi}\left(-a\sqrt{\frac{2}{3}}\operatorname{sen} t\right)\cdot\left(\frac{a\cos t}{\sqrt{6}} + \frac{a\operatorname{sen} t}{\sqrt{2}}\right)dt}_{I_2} + \underbrace{\int_0^{2\pi}\left(\frac{a}{\sqrt{2}}\cos t + \frac{a}{\sqrt{6}}\operatorname{sen} t\right)\left(-a\sqrt{\frac{2}{3}}\cos t\right)dt}_{I_3}$$