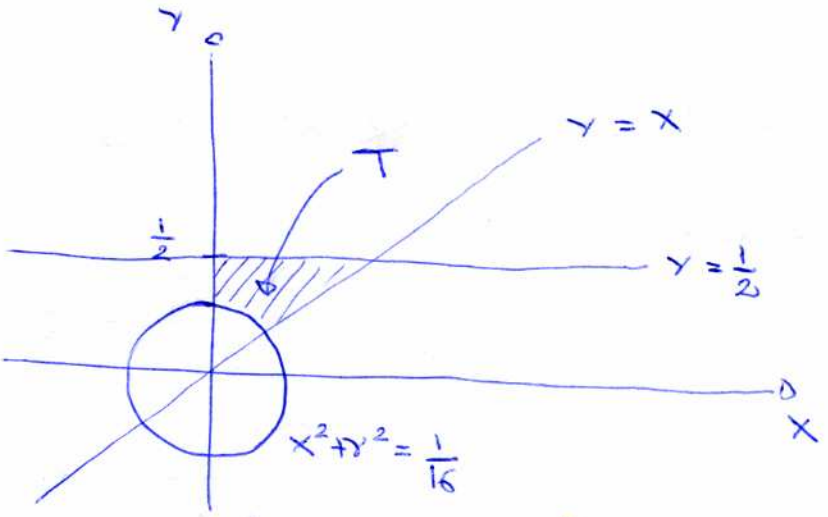
(2)



Σ' è il sostegno della superficie regolare

$$\varphi(x,y) = (x, y, x^2+y^2) \qquad (x,y) \in T$$

da cui

$$I = \int_{\Sigma'} \frac{xy^4}{(x^2+y^2)^{5/2}}\, d\sigma = \iint_T \frac{xy^4}{(x^2+y^2)^{5/2}} \|\varphi_x \wedge \varphi_y\|\, dx\,dy$$

Conviene però considerare Σ' come sostegno della superficie regolare χ equivalente a φ data da:

$$\chi(\rho,\theta) = (\rho\cos\theta, \rho\sin\theta, \rho^2)$$

$$(\rho,\theta) \text{ t.c. } \theta \in \left[\frac{\pi}{4}, \frac{\pi}{2}\right] \text{ e } \frac{1}{4} \le \rho \le \frac{1}{2\sin\theta}$$

da cui:

$$I = \int_{\pi/4}^{\pi/2} d\theta \int_{\frac{1}{4}}^{\frac{1}{2\sin\theta}} \frac{\rho^5 \cos\theta \sin^4\theta}{\rho^8}\, \rho\, (4\rho^2+1)^{\frac{1}{2}}\, d\rho$$

$$\overset{t=4\rho^2}{=} \frac{1}{8} \int_{\pi/4}^{\pi/2} d\theta \int_{\frac{1}{16}}^{\frac{1}{4\sin^2\theta}} \cos\theta \sin^4\theta\, (t+1)^{\frac{1}{2}}\, dt =$$