

$$\iint_T x \sqrt{x^2 + y^2} \, dx \, dy$$

$$\text{On case } \begin{cases} x = r \cos \theta \\ y = r \sin \theta \end{cases}$$

$$(0, 2\pi)$$

$$\text{and } dx \, dy = r \, dr \, d\theta \rightarrow (0, 2\pi)$$

$$\iint_T x \sqrt{x^2 + y^2} \, dx \, dy = \iint_T r^3 \cos \theta \, dr \, d\theta \quad (0, \pi)$$

$$= \int_{\frac{\pi}{2}}^{\pi} \left[\int_0^2 r^3 \cos \theta \, dr \right] d\theta \quad (0, \pi)$$

$$= \int_{\frac{\pi}{2}}^{\pi} \frac{15}{4} \cos \theta \, d\theta = \frac{15}{4} \sin \theta \Big|_{\frac{\pi}{2}}^{\pi}$$

$$= -\frac{15}{4}$$

$$(0, 15)$$