

7.11.

Inför sfäriskt polära koordinater :

$$x = r \sin \theta \cos \varphi$$

$$y = r \sin \theta \sin \varphi \quad dx dy dz = r^2 \sin \theta dr d\theta d\varphi$$

$$z = r \cos \theta$$

$$M = \int_D z dx dy dz = \int_{D_{r\theta\varphi}} r \cos \theta r^2 \sin \theta dr d\theta d\varphi$$

$$D_{r\theta\varphi} = (r, \theta, \varphi) : 0 \leq r \leq 1, 0 \leq \theta \leq \frac{\pi}{2}, 0 \leq \varphi \leq \pi$$

$$M = \frac{1}{4} \pi \frac{\sin^2 \frac{\pi}{2}}{2} = \frac{\pi}{8}$$

SVAR:

$$\int_D z dx dy dz = \frac{\pi}{8}$$