

Problem 113 *Let S be the surface given by the following parameterization:*

$$\Psi(\theta, \phi) = (\cos \phi \cos \theta, \cos \phi \sin \theta, \sin \phi)$$

$$0 \leq \theta \leq 2\pi, \quad -\frac{\pi}{4} \leq \phi \leq \frac{\pi}{4}$$

(Note that this is not quite spherical coordinates.)

Integrate over S the vector field

$$\mathbf{W} = \left\langle \frac{1}{x}, \frac{1}{y}, 0 \right\rangle$$