Special Problem 2-5.13

Determine the surface integral:

$$\iint\limits_{S} \mathbf{A}(\bar{r}) \cdot \overline{ds}$$

where:

$$\mathbf{A}(\bar{r}) = \left(\frac{\rho^2 + z^2}{5} \right) \hat{a}_x + z\,\hat{a}_y + \rho\,\hat{a}_z$$

and surface S, lying **entirely** on the y-z plane, has shape: