

**Special Problem 2-5.14**

Contour  $C$  is a straight line extending from a beginning point at:

$$x = 0, y = 2, z = 3$$

to an ending point at:

$$x = 2, y = 2, z = 3$$

Evaluate the contour integral:

$$\int_C \mathbf{A}(\bar{\mathbf{r}}) \cdot d\bar{\ell}$$

where

$$\mathbf{A}(\bar{\mathbf{r}}) = \rho^2 z \cos \phi \sin \phi \hat{\mathbf{a}}_x + z \hat{\mathbf{a}}_y + z^2 \hat{\mathbf{a}}_z$$