Special Problem 2-5.10

Evaluate the integral:

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

where $\mathbf{G}(\bar{r})$ is some **arbitrary** vector field equal to:

$$\mathbf{G}(\bar{r}) = \pi r \sin\phi\; \hat{a}_r + 2\; \hat{a}_\theta + r^2\; \hat{a}_\phi$$

and contour C lies on the **y-z plane** as shown below: