



**Scalar
Line \int
Solutions**

Example

$$\vec{r}(t) = \langle \cos t, \sin t, t \rangle$$

$$0 \leq t \leq 2\pi$$

$$f(x, y, z) = x^2 + y^2 + z^2$$

$$\int f \, ds$$

$$ds = |\vec{r}'(t)| \, dt$$

$$\vec{r}'(t) = \langle -\sin t, \cos t, 1 \rangle$$

Example

$$|r'(t)| = \sqrt{(-\sin t)^2 + (\cos t)^2 + 1}$$

$$= \sqrt{2}$$

$$\int f \, ds \quad \left| \begin{array}{l} ds = |r'(t)| \, dt \\ r'(t) = \langle -\sin t, \cos t, 1 \rangle \end{array} \right.$$