Scalar Line Integrals

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Scalar Line Integral Practice Problems

1. Compute $\int_{\mathcal{C}} xy + z ds$ where $\mathcal{C}$ is parametrized by $\mathbf{r}(t) = \langle \cos t, \sin t, t \rangle$ for $0 \leq t \leq \pi$.

2. Set up the integral $\int_{\mathcal{C}} \frac{y^3}{x^7} ds$ where $\mathcal{C}$ is the curve $y = \frac{1}{4}x^4$ for $1 \leq x \leq 2$.

3. Let $\mathcal{C}$ be the piecewise linear path from $(0, 1)$ to $(2, 0)$ to $(2, 1)$. Evaluate $\int_{\mathcal{C}} x + y ds$.

Challenge Problems

1. Let $\mathcal{C}$ be the piecewise linear path from $(0, 0, 1)$ to $(0, 2, 0)$ to $(1, 1, 1)$. Evaluate $\int_{\mathcal{C}} x e^{z^2} ds$.