Lecture 30 Worksheet

July 28, 2021

1. Let $\vec{F} = \langle -x^2 - 2y, y - 2x, 2xz - z \rangle$. Is $\vec{F}$ conservative? Irrotational? Incompressible?

2. Let $\vec{F} = \langle \cos(xz), ye^{xz}, x^2 + y^2 + z^2 \rangle$. Find $\text{div}(\vec{F})$.

3. Let S be the closed (i.e. with a top and bottom) cylinder $x^2 + y^2 = 4$ from $z = 0$ to $z = 5$. Evaluate the integral.

$$\iint_S \langle yz^2 + x^3, y^3 - x^4 - z^2, x^3 - y^3 \rangle \cdot d\vec{S}$$