

Vector Calculus
Grad, Div and Curl

Question

Calculate **div** \underline{F} and **curl** \underline{F} for the vector field

$$\underline{F} = yz\underline{i} + xz\underline{j} + xy\underline{k}$$

Answer

$$\operatorname{div}\underline{F} = \frac{\partial}{\partial x}(yz) + \frac{\partial}{\partial y}(xz) + \frac{\partial}{\partial z}(xy) = 0$$

$$\begin{aligned} \operatorname{curl}\underline{F} &= \begin{vmatrix} \underline{i} & \underline{j} & \underline{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ yz & xz & xy \end{vmatrix} \\ &= (x - x)\underline{i} + (y - y)\underline{j} + (z - z)\underline{k} = \underline{0} \end{aligned}$$