

Answer on Question #68203 – Math – Calculus

Question

Determine the directional derivative of

$$f=xy^2+yz^3$$

at the point (2, -1, 1) in the direction of vector $i+2j+2k$

Solution

$$\begin{aligned} D_u f(x, y, z) &= f_x u_1 + f_y u_2 + f_z u_3 = y^2 * 1 + (2xy + z^3) * 2 + 3yz^2 * 2 = \\ &= y^2 + 2(2xy + z^3) + 6yz^2. \end{aligned}$$

$$D_u f(2, -1, 1) = 1 + 2(-4 + 1) - 6 = -11.$$

Answer: -11.