

$$z = e^{x^3 y^2}, \quad x = \frac{5}{u^2} + \frac{7}{uv^3} - 3v^3, \quad y = 5u^2 v^2 - \frac{8}{v^3} - 3$$

$$\frac{\partial z}{\partial x} = 3x^2 y^2 \cdot e^{x^3 y^2} \qquad \frac{\partial z}{\partial y} = 2x^3 y \cdot e^{x^3 y^2}$$

$$\frac{\partial x}{\partial u} = -\frac{10}{u^3} - \frac{7}{u^2 v^3} \qquad \frac{\partial x}{\partial v} = -\frac{21}{uv^4} - 9v^2$$

$$\frac{\partial y}{\partial u} = 10uv^2 \qquad \frac{\partial y}{\partial v} = 10u^2 v + \frac{24}{v^4}$$

$$\frac{\partial z}{\partial u} = \frac{\partial z}{\partial x} * \frac{\partial x}{\partial u} + \frac{\partial z}{\partial y} * \frac{\partial y}{\partial u}$$

$$= 3x^2 y^2 \cdot e^{x^3 y^2} \left(-\frac{10}{u^3} - \frac{7}{u^2 v^3} \right) + 2x^3 y \cdot e^{x^3 y^2} 10uv^2$$

$$\frac{\partial z}{\partial v} = \frac{\partial z}{\partial x} * \frac{\partial x}{\partial v} + \frac{\partial z}{\partial y} * \frac{\partial y}{\partial v}$$

$$= 3x^2 y^2 \cdot e^{x^3 y^2} \left(-\frac{21}{uv^4} - 9v^2 \right) + 2x^3 y \cdot e^{x^3 y^2} \left(10u^2 v + \frac{24}{v^4} \right)$$