16.12: Partial Derivatives

- $\frac{\partial^2 z}{\partial x \partial y} = \frac{\partial^2 z}{\partial y \partial x}$
- $\left(\frac{\partial y}{\partial x}\right)_{z,u} = \frac{1}{(\partial x/\partial y)_{z,u}}$
- $\left(\frac{\partial y}{\partial x}\right)_z \left(\frac{\partial x}{\partial z}\right)_y \left(\frac{\partial z}{\partial y}\right)_x = -1$
- $du = \left(\frac{\partial u}{\partial x_1}\right)_{x_2,x_3\ldots} dx_1 + \left(\frac{\partial u}{\partial x_2}\right)_{x_1,x_3\ldots} dx_2 + \left(\frac{\partial u}{\partial x_3}\right)_{x_1,x_2\ldots} dx_3$
- Given $u = u(x,y)$, $x = x(\theta, r)$ and $y = y(\theta, r)$

$$\left(\frac{\partial u}{\partial r}\right)_\theta = \left(\frac{\partial u}{\partial x}\right)_y \left(\frac{\partial x}{\partial r}\right)_\theta + \left(\frac{\partial u}{\partial y}\right)_x \left(\frac{\partial y}{\partial r}\right)_\theta$$
$$\left(\frac{\partial u}{\partial \theta}\right)_r = \left(\frac{\partial u}{\partial x}\right)_y \left(\frac{\partial x}{\partial \theta}\right)_r + \left(\frac{\partial u}{\partial y}\right)_x \left(\frac{\partial y}{\partial \theta}\right)_r$$

This page titled 16.12: Partial Derivatives is shared under a CC BY-NC-SA 4.0 license and was authored, remixed, and/or curated by Marcia Levitus via source content that was edited to the style and standards of the LibreTexts platform.