

Aufgabe 18.20

Sei $z = \ln(e^x + e^y)$, $y = x^2$. Berechnen Sie $\frac{\partial z}{\partial x}$ und $\frac{dz}{dx}$!

Lösung:

$$\frac{\partial z}{\partial x} = \frac{e^x}{e^x + e^y} = \frac{e^x}{e^x + e^{x^2}}$$

$$\frac{dz}{dx} = \frac{d}{dx} z(x, y(x)) = \frac{\partial z}{\partial x} \frac{dx}{dx} + \frac{\partial z}{\partial y} \frac{dy}{dx} = \frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} y' = \frac{e^x}{e^x + e^y} + \frac{e^y}{e^x + e^y} 2x = \frac{e^x + 2xe^{x^2}}{e^x + e^{x^2}}$$