

Reinigungsaflede

$$f(x,y) \quad \frac{\partial f}{\partial x}(x,y) = \lim_{h \rightarrow 0} \frac{f(x+h,y) - f(x,y)}{h}$$

$$\underline{u} \quad |\underline{u}|=1 \quad D_{\underline{u}} f(x,y) = \lim_{h \rightarrow 0} \frac{f(x,y+h\underline{u}) - f(x,y)}{h}$$

$$D_{\underline{u}} f(x,y) = \nabla f(x,y) \cdot \underline{u} = u_1 \frac{\partial f}{\partial x}(x,y) + u_2 \frac{\partial f}{\partial y}(x,y)$$

$$f(x,y) = e^x \sin y \quad P(0, \frac{\pi}{4}) \quad \underline{v} = \langle 1, -1 \rangle$$

$$\underline{u} = \frac{\underline{v}}{|\underline{v}|} = \langle \frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}} \rangle = \langle \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \rangle$$

$$\nabla f(0, \frac{\pi}{4}) = \begin{bmatrix} e^x \sin y \\ e^x \cos y \end{bmatrix}_{(0, \frac{\pi}{4})} = \begin{bmatrix} \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} \end{bmatrix}$$

$$D_{\underline{u}} f(0, \frac{\pi}{4}) = \begin{bmatrix} \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} \end{bmatrix} \cdot \begin{bmatrix} \frac{\sqrt{2}}{2} \\ -\frac{\sqrt{2}}{2} \end{bmatrix} = \frac{1}{2} - \frac{1}{2} = 0$$

Rekningsafledede

$$f(x, y) + h(1, 0)$$

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$$\underline{u} \quad |\underline{u}| = 1 \quad D_{\underline{u}} f(x, y) = \lim_{h \rightarrow 0} \frac{f(x, y) + h\underline{u} - f(x, y)}{h}$$

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$$D_{\underline{u}} f(0, \frac{\pi}{4}) = \begin{bmatrix} \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} \end{bmatrix} \cdot \begin{bmatrix} \frac{\sqrt{2}}{2} \\ -\frac{\sqrt{2}}{2} \end{bmatrix} = \frac{1}{2} - \frac{1}{2} = 0$$