

8. minidest MGI, 26.11.

Vypočítejte směrovou derivaci funkce

$$f(x, y) = \sin(4x - y^2)$$

v bodě $A = [1, 2]$ ve směru vektoru $\vec{u} = (1, 1)$

$$\frac{\partial f}{\partial x} = 4 \cos(4x - y^2) \quad \Big|_{[1, 2]} = 4 \cos 0 = 4$$

$$\frac{\partial f}{\partial y} = (-2y) \cos(4x - y^2) \quad \Big|_{[1, 2]} = -4 \cos 0 = -4$$

$$\nabla f(1, 2) = (4, -4)$$

$$\|\vec{u}\| = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$D_{\vec{u}} f(A, \vec{u}) = \nabla f(A) \cdot \frac{\vec{u}}{\|\vec{u}\|}$$

$$= (4, -4) \cdot \left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}} \right)$$

$$= 4 \cdot \frac{1}{\sqrt{2}} + (-4) \cdot \frac{1}{\sqrt{2}} = 0$$