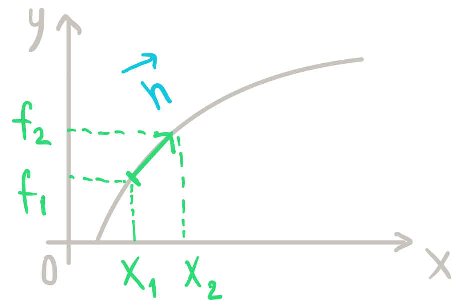
TOTÁLNÍ DIFERENCIÁL

- dáno: bod $C[x,y]$; funkce $f(x,y)$; $\}\ \nabla f$
  přírůstek $\vec{h}\,(h_x, h_y)$

$$\boxed{Df(C) = \nabla f \cdot \vec{h}} = \frac{\partial f}{\partial x}(C)\cdot h_x + \frac{\partial f}{\partial y}(C)\cdot h_y$$



LOKÁLNÍ EXTRÉMY

$\boxed{2D}$: $f(x,y)$

$$\left.\begin{array}{l} \dfrac{\partial f}{\partial x} = 0 \\[2ex] \dfrac{\partial f}{\partial y} = 0 \end{array}\right\}$$

PODEZŘELÝ BOD $P[x,y]$

$$D^2 f(P) = \begin{pmatrix} \dfrac{\partial^2 f}{\partial x^2} & \dfrac{\partial^2 f}{\partial x \partial y} \\[2ex] \dfrac{\partial^2 f}{\partial y \partial x} & \dfrac{\partial^2 f}{\partial y^2} \end{pmatrix} \quad D_1,\ D_2$$

$D_N = 0$ .... nic neříkající
$D_2 < 0$ .... sedlový bod
$D_2 > 0 \quad D_1 > 0$ .... lok. minimum
$D_2 > 0 \quad D_1 < 0$ .... lok. maximum

$\boxed{3D}$: $f(x,y,z)$

$$\left.\begin{array}{l} \dfrac{\partial f}{\partial x} = 0 \\[2ex] \dfrac{\partial f}{\partial y} = 0 \\[2ex] \dfrac{\partial f}{\partial z} = 0 \end{array}\right\}$$

STACIONÁRNÍ BOD $P[x,y,z]$

$$D^2 f(P) = \begin{pmatrix} \dfrac{\partial^2 f}{\partial x^2} & \dfrac{\partial^2 f}{\partial x \partial y} & \dfrac{\partial^2 f}{\partial x \partial z} \\[2ex] \dfrac{\partial^2 f}{\partial y \partial x} & \dfrac{\partial^2 f}{\partial y^2} & \dfrac{\partial^2 f}{\partial y \partial z} \\[2ex] \dfrac{\partial^2 f}{\partial z \partial x} & \dfrac{\partial^2 f}{\partial z \partial y} & \dfrac{\partial^2 f}{\partial z^2} \end{pmatrix} \quad D_1,\ D_2,\ D_3$$

$D_N = 0$ .... nic neříkající
$D_3 > 0 \quad D_2 > 0 \quad D_1 > 0$ .... lok. minimum
$D_3 < 0 \quad D_2 > 0 \quad D_1 < 0$ .... lok. maximum
JINAK .... sedlový bod