(1) $F = (F_1, F_2) : \mathbb{R}^2 \to \mathbb{R}^2$

$$F(x,y) = \left(|x^2y| + \sin(xy),\ \arctan(x-4y) \right)$$

13 (a) $F'(2,1)$?

12 (b) $\frac{\partial F_1}{\partial x}(0,0)$?

3 (a) na okolí $(2,1)$ je $|x^2y| = x^2y$ $\quad$ $\forall$ parc. der. jsou spoj. v $(2,1)$ tedy $\exists\, F'(2,1)$

2x4
$$\frac{\partial F_1}{\partial x} = 2xy + \cos(xy)\cdot y \qquad \frac{\partial F_1}{\partial y} = x^2 + \cos(xy)\cdot x$$

$$\frac{\partial F_2}{\partial x} = \frac{1}{1+(x-4y)^2} \qquad \frac{\partial F_2}{\partial y} = \frac{1}{1+(x-4y)^2}\cdot(-4)$$

2 v $(2,1)$:
$$\begin{pmatrix} 4+\cos 2 & 4+2\cos 2 \\ \frac{1}{5} & -\frac{4}{5} \end{pmatrix}$$

(b) Uvažujme funkci $g(x,y) = |x^2y|$.

4x2
$$\frac{\partial g}{\partial x}(0,0) = \lim_{t\to 0} \frac{|(0+t^2)\cdot 0| - 0}{t} = \lim \frac{0}{t} = \underline{\underline{0}}$$

2 Pro $h = \sin(xy)$ platí

$$\frac{\partial h}{\partial x}(0,0) = \cos(xy)\cdot y\ (0,0) = 1\cdot 0 = 0$$

2 Dohromady $\frac{\partial F_1}{\partial x}(0,0) = 0+0$

(25)

(2) $x^3+y^7 = e^{xy^2} - \sin y$ $\quad (1,0) \quad y'(1) = ?$

3 $F(x,y) = x^3+y^7 - e^{xy^2} + \sin y \qquad G = \mathbb{R}^2, \; k=1$

3 • $F \in C^1(\mathbb{R}^2)$

3 • $F(1,0) = 1+0-e^0+0 = 0$

$\frac{\partial F}{\partial y} = -e^{xy^2} \cdot 2yx + \cos y + 7y^6$

5 $\frac{\partial F}{\partial y}(1,0) = 0 + 1 + 0 = +1 \neq 0$

3 Tedy $\exists$ okolí U bodu 1 a okolí V bodu 0 takové, že

$\forall x \in U \; \exists!\, y \in V$ s vlastností $F(x,y) = 0$.

Navíc $y \in C^1(U)$.

5 • $\frac{\partial F}{\partial x} = 3x^2 - e^{xy^2} \cdot y^2$

$\frac{\partial F}{\partial x}(1,0) = 3 - 0 = 3$

3 Pak $y'(1) = -\frac{3}{+1} = \underline{\underline{-3}}$