- $x^2+y^2=1$

$y=\pm\sqrt{1-x^2}$

$x=\pm\sqrt{1-y^2}$

- $0 = x^2+y^2-1-x^{2/3}y$

$F(x,y) = x^2+y^2-1-y\sqrt[3]{x^2}$ v $a=[1,1]$

- $F\in C^1(G)$ $\quad G = B((1,1), 1/4)$ (pozor na $x=0$)
- $F(1,1) = 1+1-1-1=0$
- $\dfrac{\partial F}{\partial y} = 2y - \sqrt[3]{x^2}$ $\quad \dfrac{\partial F}{\partial y}(1,1) = 2-1=1\neq 0$

$\dfrac{\partial F}{\partial x} = 2x - y\,\dfrac{2}{3}\,\dfrac{1}{\sqrt[3]{x}}$ $\quad \dfrac{\partial F}{\partial x}(1,1) = 2-\dfrac{2}{3}=\dfrac{4}{3}$

$$y' = -\frac{2x - y\frac{2}{3}\frac{1}{\sqrt[3]{x}}}{2y-\sqrt[3]{x^2}}$$

dle vzorečku:

$$\underset{x_0}{y'(1)} = -\frac{4/3}{1} = -\frac{4}{3}$$

dle řetízkového pravidla

$$0 = x^2 + (y(x))^2 - 1 - x^{2/3}(y(x))$$

$\frac{\partial}{\partial x}$:

$$0 = 2x + 2y\cdot y' - \frac{2}{3}x^{-1/3}y - x^{2/3}y'$$

$$y'(2y - x^{2/3}) = -2x + \frac{2}{3}x^{-1/3}y$$

$$y' = \frac{-2x+\frac{2}{3}y\frac{1}{\sqrt[3]{x}}}{2y-x^{2/3}}$$

v $(\overset{x_0}{1}, \overset{y_0}{1})$

$$y'(1) = \frac{-2+\frac{2}{3}}{2-1} = -\frac{4}{3}$$

• 2. dce.:

$$0 = 2x + 2y\cdot y' - \frac{2}{3}x^{-1/3}y - x^{2/3}y'$$

$\partial/\partial x$:

$$0 = 2 + 2y'y' + 2yy'' - \frac{2}{3}\left(-\frac{1}{3}\right)x^{-4/3}y - \frac{2}{3}x^{-1/3}y' - \frac{2}{3}x^{-1/3}y' - x^{2/3}y''$$

v (1,1)

$y'(1) = -4/3$

$$0 = 2 + 2\cdot\left(-\frac{4}{3}\right)^2 + 2\underline{y''} + \frac{2}{9} + \frac{2}{3}\cdot\frac{4}{3} + \frac{2}{3}\cdot\frac{4}{3} - \underline{y''}$$

$$\underline{\underline{-\frac{68}{9} = y''}}$$