$\boxed{7 | 1}$ $f(x,y) = x^2 \cdot e^{\sqrt{y+1}}$ $\mathcal{D}(f) = \{(x,y) \in \mathbb{R}^2, y \geq -1\}$

$A = (1,0)$ $z_0 = f(1,0) = e$

$\frac{\partial f}{\partial x}(x,y) = 2x e^{\sqrt{y+1}}$ $\frac{\partial f}{\partial x}(1,0) = 2e$

$\frac{\partial f}{\partial y}(x,y) = x^2 \cdot \frac{e^{\sqrt{y+1}}}{2\sqrt{y+1}}$ $\frac{\partial f}{\partial y}(1,0) = \frac{e}{2}$

$df(1,0; dx, dy) = \underline{\underline{2e\,dx + \frac{e}{2} dy}}$

$T_1(x,y) = \underline{\underline{e + 2e(x-1) + \frac{e}{2}(y)}}$

TEČNÁ ROVINA: $z - z_0 = \frac{\partial f}{\partial x}(x_0,y_0)(x-x_0) + \frac{\partial f}{\partial y}(x_0,y_0)(y-y_0)$

$z - e = 2e(x-1) + \frac{e}{2} \cdot y$

$\underline{\frac{z}{e} + 1 = 2x + \frac{y}{2}}$

$\boxed{7/2}$ $f(x,y) = \dfrac{\operatorname{arctg} x}{y}$ $\qquad D_f = \{(x,y) \in \mathbb{R}^2,\ y \neq 0\}$

$(x_0, y_0) = (0,1)$

$f(0,1) = 0$

$$\frac{\partial f}{\partial x}(x,y) = \frac{1}{y} \cdot \frac{1}{x^2+1} = \frac{1}{y(x^2+1)} \qquad \frac{\partial f}{\partial x}(0,1) = 1$$

$$\frac{\partial f}{\partial y}(x,y) = -\frac{\operatorname{arctg} x}{y^2} \qquad \frac{\partial f}{\partial y}(0,1) = 0$$

$$\frac{\partial^2 f}{\partial x^2}(x,y) = -\frac{2x}{y\,(x^2+1)^2} \qquad \frac{\partial^2 f}{\partial x^2}(0,1) = 0$$

$$\frac{\partial^2 f}{\partial x \partial y}(x,y) = -\frac{1}{y^2(x^2+1)} \qquad \frac{\partial^2 f}{\partial x \partial y}(0,1) = -1$$

$$\frac{\partial^2 f}{\partial y^2}(x,y) = +2\frac{\operatorname{arctg} x}{y^3} \qquad \frac{\partial^2 f}{\partial y^2}(0,1) = 0$$

$$T_2(x,y) = 0 + 1(x-0) + 0(y-1) + \frac{1}{2}\left(0(x-0)^2 + 2(x-0)(y-1) + 0(y-1)^2\right)$$

$$= x + \frac{1}{2} \cdot 2x \cdot (y-1) = x + x(y-1) = \underline{\underline{x \cdot y}}$$

$$\frac{\operatorname{arctg}(0{,}01)}{0{,}98} = f(0{,}01;\ 0{,}98) \doteq T_2(0{,}01;\ 0{,}98)$$

$$= \underline{\underline{0{,}0098}}$$

$\boxed{7|3}$

$$\left.\begin{aligned} 4y^2 - x^2 &= 1 \\ x - e^{y+1} &= 0 \end{aligned}\right\}$$

$4y^2 - x^2 = 1$

$\dfrac{y^2}{\left(\frac{1}{2}\right)^2} - x^2 = 1$

HYPERBOLA

$a = 1 \quad b = \frac{1}{2}, S = [0, 0]$

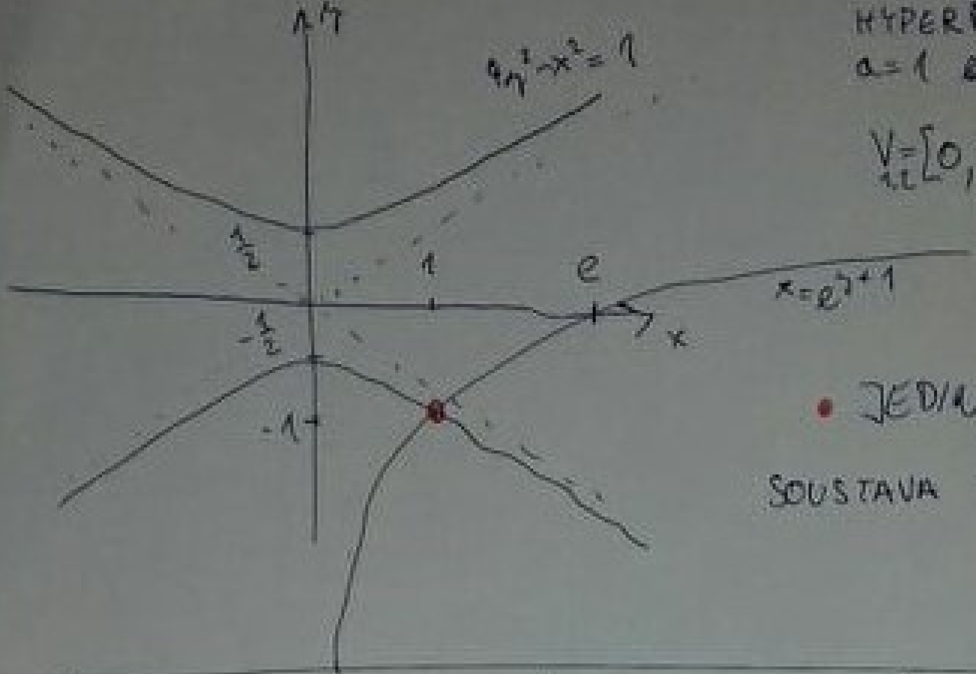
$V_{1,2} = [0, \pm\frac{1}{2}]$

$x - e^{y+1} = 0$

$x = e^{y+1}$

$\ln x = y + 1$

$y = \ln x - 1$



• JEDINÝ PRŮSEČÍK, SOUSTAVA MÁ PRÁVĚ JEDNO ŘEŠENÍ.

$$F(x, y) = \begin{pmatrix} 4y^2 - x^2 - 1 \\ x - e^{y+1} \end{pmatrix}$$

$$(x_0, y_0) = (1, -1)$$

$$F(1, -1) = \begin{pmatrix} 4 - 1 - 1 \\ 1 - 1 \end{pmatrix} = \begin{pmatrix} 2 \\ 0 \end{pmatrix}$$

$$J_F(x, y) = \begin{pmatrix} -2x & 8y \\ 1 & -e^{y+1} \end{pmatrix}; \quad J_F(1, -1) = \begin{pmatrix} -2 & -8 \\ 1 & -1 \end{pmatrix} \quad \det J_F = 2 + 8 = 10$$

$$J_F^{-1}(1, -1) = \frac{1}{10}\begin{pmatrix} -1 & 8 \\ -1 & -2 \end{pmatrix}$$

$$\begin{pmatrix} x_1 \\ y_1 \end{pmatrix} = \begin{pmatrix} x_0 \\ y_0 \end{pmatrix} - J_F^{-1}(x_0, y_0)\begin{pmatrix} 2 \\ 0 \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} - \frac{1}{10}\begin{pmatrix} -1 & 8 \\ -1 & -2 \end{pmatrix}\begin{pmatrix} 2 \\ 0 \end{pmatrix} =$$

$$= \begin{pmatrix} 1 \\ -1 \end{pmatrix} - \frac{1}{10}\begin{pmatrix} -2 \\ -2 \end{pmatrix} = \underline{\underline{\begin{pmatrix} 1{,}2 \\ -0{,}8 \end{pmatrix}}}$$

$x_1 = \underline{1{,}2}$

$y_1 = \underline{\underline{-0{,}8}}$