$F_1(x_1, x_2, y_1, y_2) = 0$ $\qquad$ $y_1 = y_1(x_1, x_2)$ $\qquad$ $y_2 = y_2(x_1, x_2)$

$F_2(x_1, x_2, y_1, y_2) = 0$

$$0 = \frac{\partial F_1(x_1, x_2, y_1(x_1,x_2), y_2(x_1,x_2))}{\partial x_1} = \frac{\partial F_1}{\partial x_1}\overbrace{\frac{\partial x_1}{\partial x_1}}^{1} + \cancel{\frac{\partial F_1}{\partial x_2}\overbrace{\frac{\partial x_2}{\partial x_1}}^{0}} + \frac{\partial F_1}{\partial y_1}\frac{\partial y_1}{\partial x_1} + \frac{\partial F_1}{\partial y_2}\frac{\partial y_2}{\partial x_1}$$

$$0 = \frac{\partial F_2(x_1, x_2, y_1(x_1,x_2), y_2(x_1,x_2))}{\partial x_1} = \frac{\partial F_2}{\partial x_1} + \frac{\partial F_2}{\partial y_1}\frac{\partial y_1}{\partial x_1} + \frac{\partial F_2}{\partial y_2}\frac{\partial y_2}{\partial x_1} = 0$$

(1) $F_1(x,y,z) = (x-1)^2 + y^2 - z = 0$ $\qquad \exists\, (x,y,z) \in \mathbb{R}^3$ t.q. $F(x,y,z)=0$

(2) $F_2(x,y,z) = x^2+y^2+z^2-1 = 0$ $\qquad y(x),\ z(x)$

$$F'_y = \begin{pmatrix} \frac{\partial F_1}{\partial y} & \frac{\partial F_1}{\partial z} \\ \frac{\partial F_2}{\partial y} & \frac{\partial F_2}{\partial z} \end{pmatrix} = \begin{pmatrix} 2y & -1 \\ 2y & 2z \end{pmatrix} \qquad F'_x = \begin{pmatrix} \frac{\partial F_1}{\partial x} \\ \frac{\partial F_2}{\partial x} \end{pmatrix} = \begin{pmatrix} 2(x-1) \\ 2x \end{pmatrix}$$

$$0 \neq \det F'_y = 4zy + 2y = 2y(2z+1) \neq 0 \qquad \boxed{y \neq 0},\ \cancel{z \neq -1/2}$$

$z = -1/2 \Rightarrow (x-1)^2 + y^2 + 1/2 = 0$ N.T.S. nunca!!

$y=0$ $\qquad (x-1)^2 - z = 0 \qquad x^2+z^2-1=0 \qquad (x-1)^4 + x^2 - 1 = 0 \qquad \begin{matrix} x=0 \\ x=1 \end{matrix}$

$A(0,0,1)$ $\quad B(1,0,0)$ aquí no puedo aplicar el T.F.I.

$$Df(x) = \begin{pmatrix} y'(x) \\ z'(x) \end{pmatrix} = -\begin{pmatrix} 2y & -1 \\ 2y & 2z \end{pmatrix}^{-1} \begin{pmatrix} 2(x-1) \\ 2x \end{pmatrix}$$

$$\left(\begin{array}{cc|cc} 2y & -1 & 1 & 0 \\ 2y & 2z & 0 & 1 \end{array}\right)$$

$$\begin{pmatrix} 2y & -1 \\ 2y & 2z \end{pmatrix}^{-1} = \frac{1}{2y(2z+1)} \begin{pmatrix} 2z & 1 \\ -2y & 2y \end{pmatrix}$$

$$F_y'^{\,T} = \begin{pmatrix} 2y & 2y \\ -1 & 2z \end{pmatrix}$$

$$Df(x) = \frac{-1}{\cancel{2}y(2z+1)} \begin{pmatrix} 2z & 1 \\ -2y & 2y \end{pmatrix} \begin{pmatrix} \cancel{2}(x-1) \\ \cancel{2}x \end{pmatrix} =$$

$$= \frac{-1}{y(2z+1)} \begin{pmatrix} 2z(x-1) + x \\ -2y(x-1) + 2xy \end{pmatrix} = \begin{pmatrix} \dfrac{-2xz + 2z - x}{y(2z+1)} \\[2ex] \dfrac{-2\cancel{y}}{\cancel{y}(2z+1)} \end{pmatrix}$$

$y'(x) = -\dfrac{2xz - 2z + x}{y(2z+1)}$ $\qquad z'(x) = -\dfrac{2}{2z+1}$ $\qquad y''(x) = \dfrac{d}{dx}\left(\quad \right)$

$z(x)$; $y(x)$

$F_1 = (x-1)^2 + y^2 - z = 0$

$F_2 = x^2 + y^2 + z^2 - 1 = 0$

$y(x) \quad z(x)$

$$\frac{\partial F_1}{\partial x} = 2(x-1) + 2y\,y_x - z_x = 0 \qquad (1)$$

$$\frac{\partial F_2}{\partial x} = 2x + 2y_x\,y + 2z\,z_x = 0 \qquad (2)$$

descartado (1)

$$(2)-(1) \Rightarrow \cancel{2x} - \cancel{2x} + 2 + 2z\,z_x + z_x = 0 \qquad \underbrace{(2z+1)}_{\neq 0} z_x = -2 \qquad \cancel{z \neq -1/2}$$

$$z_x = -\frac{2}{2z+1}$$

$$2z\cdot(1)+(2) \Rightarrow 4z(x-1) + 4zy\,y_x - \cancel{2z\,z_x} + 2x + 2y_x\,y + \cancel{2z\,z_x} = 0$$

$$(4zy + 2y)\,y_x = -4z(x-1) - 2x$$

$$\underbrace{y(2z+1)}_{\neq 0}\, y_x = -\left(2z(x-1)+x\right) \Rightarrow y_x = -\frac{2zx-2z+x}{y(2z+1)}$$

$y \neq 0$

Debemos: Resolver el problema $x(z)$ e $y(z)$.