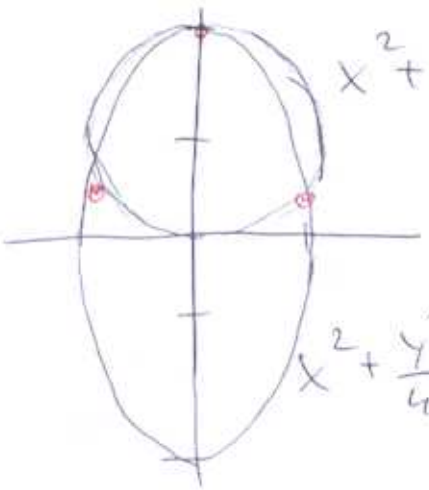
4. (a) $x^2 + (y-1)^2 = 1 \iff 0 = f_1(x,y) = x^2 + (y-1)^2 - 1$

$x^2 + \frac{1}{4} y^2 = 1 \iff f_2(x,y) = x^2 + \frac{y^2}{4} - 1 = 0$

(a)



$\frac{1}{4}$

3 soluções

$\frac{1}{4}$

(b) $J(x,y) = \begin{pmatrix} 2x & 2(y-1) \\ 2x & \frac{1}{2}y \end{pmatrix}$ $\frac{1}{4}$

Seja $x^{(0)} = \begin{pmatrix} x_0 \\ y_0 \end{pmatrix} = \begin{pmatrix} 0.9 \\ 0.6 \end{pmatrix}$, $F(x,y) = \begin{pmatrix} x^2+(y-1)^2-1 \\ x^2+\frac{y^2}{4}-1 \end{pmatrix}$ $\frac{1}{4}$

k	$x^{(k)}$	$F(x^{(k)})$	$\|F(x^{(k)})\|_\infty$	$\|s^{(k-1)}\|_\infty$	$s^{(k)}$
0	$\begin{pmatrix} 0.9 \\ 0.6 \end{pmatrix}$	$\begin{pmatrix} -0.03 \\ -0.1 \end{pmatrix}$	0.1	$\frac{1}{4}$	—	$\begin{pmatrix} .0449 \\ .0636 \end{pmatrix}$

$J(x^{(0)}) = \begin{pmatrix} 1.8 & -0.8 \\ 1.8 & 0.3 \end{pmatrix}$, $-F(x^{(0)}) = \begin{pmatrix} 0.03 \\ 0.1 \end{pmatrix}$

$\left(\begin{array}{cc|c} 1.8 & -0.8 & 0.03 \\ 1.8 & 0.3 & 0.1 \end{array}\right) \rightsquigarrow \left(\begin{array}{cc|c} 1.8 & -0.8 & 0.03 \\ 0 & 1.1 & 0.07 \end{array}\right)$ $\frac{1}{2}$