MINIMO
MASSIMO SELLA

$f(x,y) = x^3 - 2xy + 2y^2 - 4x$

$f_x = 3x^2 - 2y - 4$

$f_y = -2x + 4y$

$$f''(x,y) = \begin{pmatrix} f_{xx} & f_{xy} \\ 6x & -2 \\ -2 & 4 \\ f_{yx} & f_{yy} \end{pmatrix}$$

$\nabla f = 0 \quad \begin{cases} f_x = 0 \\ f_y = 0 \end{cases}$

$\begin{cases} 3x^2 - 2y - 4 = 0 \\ -2x + 4y = 0 \Rightarrow y = \frac{x}{2} \end{cases}$

$3x^2 - x - 4 = 0 \qquad x_{1,2} =$

$3\left[x^2 - \frac{1}{3}x - \frac{4}{3} \right] = 0$

$\left[(x+1)\left(x - \frac{4}{3}\right) \right]$

$(x = -1 \qquad y = -\frac{1}{2})$ ①

$\left(x = +\frac{4}{3} \qquad y = \frac{2}{3}\right)$ ②

$\left(-1, -\frac{1}{2}\right)$ SELLA

$H\left(-1, -\frac{1}{2}\right) = \begin{vmatrix} -6 & -2 \\ -2 & 4 \end{vmatrix} = -24 - 4 = -28 < 0$

$\left(\frac{4}{3}, \frac{2}{3}\right)$ MINIMO LOCALE

$H\left(\frac{4}{3}, \frac{2}{3}\right) = \begin{vmatrix} 6 \cdot \frac{4}{3} & -2 \\ -2 & 4 \end{vmatrix} = 32 - 4 = +28$

> 0

$f_{xx} = 6x = 6 \cdot \frac{4}{3} = +8$