Aula 15 - 16.3/21

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- Pontos Críticos:

- $\frac{\partial f}{\partial x} = 4x^3 + y - 6 = 0 \Rightarrow \frac{\partial f}{\partial x} = y = -4x^3 + 6$

- $\frac{\partial f}{\partial y} = x + 2y - 5 = 0 \Rightarrow \frac{\partial f}{\partial y} = y = \frac{5}{2} - \frac{x}{2}$

- Igualando as funções:

$$-4x^3 + 6 = \frac{5}{2} - \frac{x}{2}$$

$$-4x^3 + \frac{x}{2} + 6 - \frac{5}{2} = 0$$

$$8x^3 - x - 7 = 0$$

$$x = 1$$

$$y = \frac{5}{2} - \frac{x}{2}$$

$$y = \frac{5}{2} - \frac{1}{2}$$

$$y = 2$$

Portanto, o ponto $(1, 2)$ é um ponto crítico

- Hessiano:

$$H(x,y) = \begin{vmatrix} \frac{\partial^2 f}{\partial x^2}(x,y) & \frac{\partial^2 f}{\partial x \partial y}(x,y) \\ \frac{\partial^2 f}{\partial x \partial y}(x,y) & \frac{\partial^2 f}{\partial y}(x,y) \end{vmatrix}$$

- $\frac{\partial f}{\partial x} = 4x^3 - y - 6$
- $\frac{\partial f}{\partial y} = x + 2y - 5$
- $\frac{\partial f}{\partial x \partial y} = \frac{\partial f}{\partial y \partial x} = 1$

- $\frac{\partial^2 f}{\partial x^2} = 12x^2$
- $\frac{\partial^2 f}{\partial y^2} = 2$

$$H(x,y) = \begin{vmatrix} 12x^2 & 1 \\ 1 & 2 \end{vmatrix} = 24x^2 - 1$$

$\therefore H(1,2) > 0$, $\frac{\partial^2 f}{\partial x^2} > 0$

Dessa forma o ponto $(1,2)$ é mínimo local