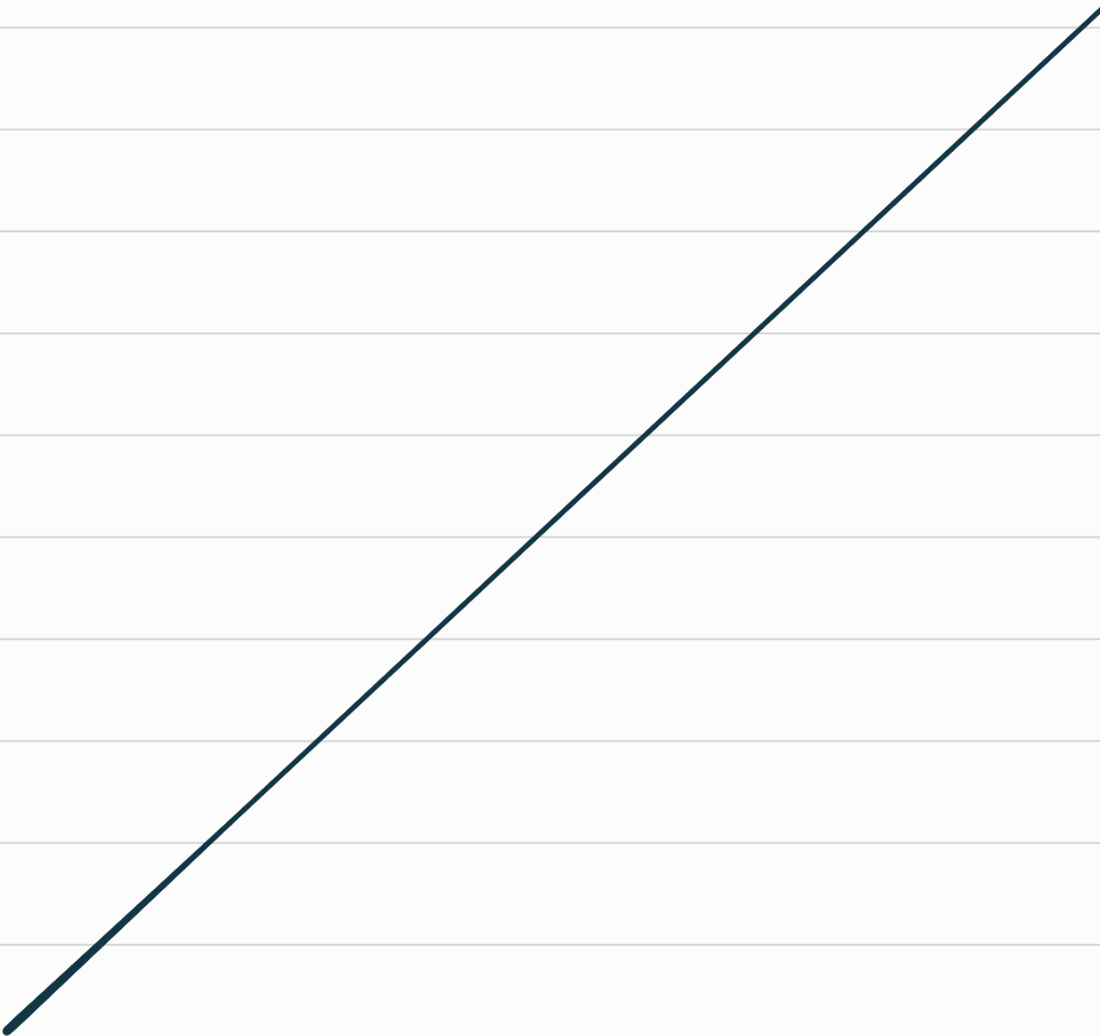


Project

① - Visualization



②. Analytical Calculations

$$\nabla f(x, y) = (0; 0)$$

$$\Leftrightarrow (2, 3)$$

$$H f(2; 3)$$

$$= \begin{pmatrix} -2 - 0,5 \cos(2) \sin(3) & -0,5 \sin(2) \cos(3) \\ -0,5 \sin(2) \cos(3) & -2 - 0,5 \cos(2) \sin(3) \end{pmatrix}$$

$$\begin{aligned} D &= (-2 - 0,5 \cos(2) \sin(3))^2 - (-0,5 \sin(2) \cos(3))^2 \\ &= 4 + \cos(2) \sin(3) + 0,25 \cos^2(2) \sin^4(3) \end{aligned}$$

$$D = (-2 - 0,5 \cos(2) \sin(3))^2 - \left(\frac{-0,5 \sin(2)}{\cos(3)} \right)^2$$

$$= 4 + \cos(2) \sin(3) + 0,25 \cos^2(2) \sin^4(3)$$

$$- 0,25 \sin^2(2) \cos^2(3)$$

$$= 4 + \cos(2) \sin(3) + 0,25 (\cos^2(2) \sin^2(3) - \sin^2(2) \cos^2(3))$$

$$= 4 + \cos(2) \sin(3) + 0,25 x$$

$$x = (\cos(2) \sin(3) + \sin(2) \cos(3)) (\cos(2) \sin(3) - \sin(2) \cos(3))$$

$$= 4 + \cos(2) \sin(3) + 0,25 \sin(5) \sin(1)$$

$$\approx 3,54 > 0$$

et $f_{xx} \approx -1,975 < 0$

donc local maximum.

③ - Numerical

$$f_x = 0$$

$$-2(x-2)e^{-((x-2)^2+(y-3)^2)} - 0,5 \sin(2) \sin(y) = 0$$

$$\Leftrightarrow x = \frac{0,5 \sin(x) \sin(y)}{-2e^{-6}} + 2$$

