Taller 6 - Optimización Convexa - 2022-1

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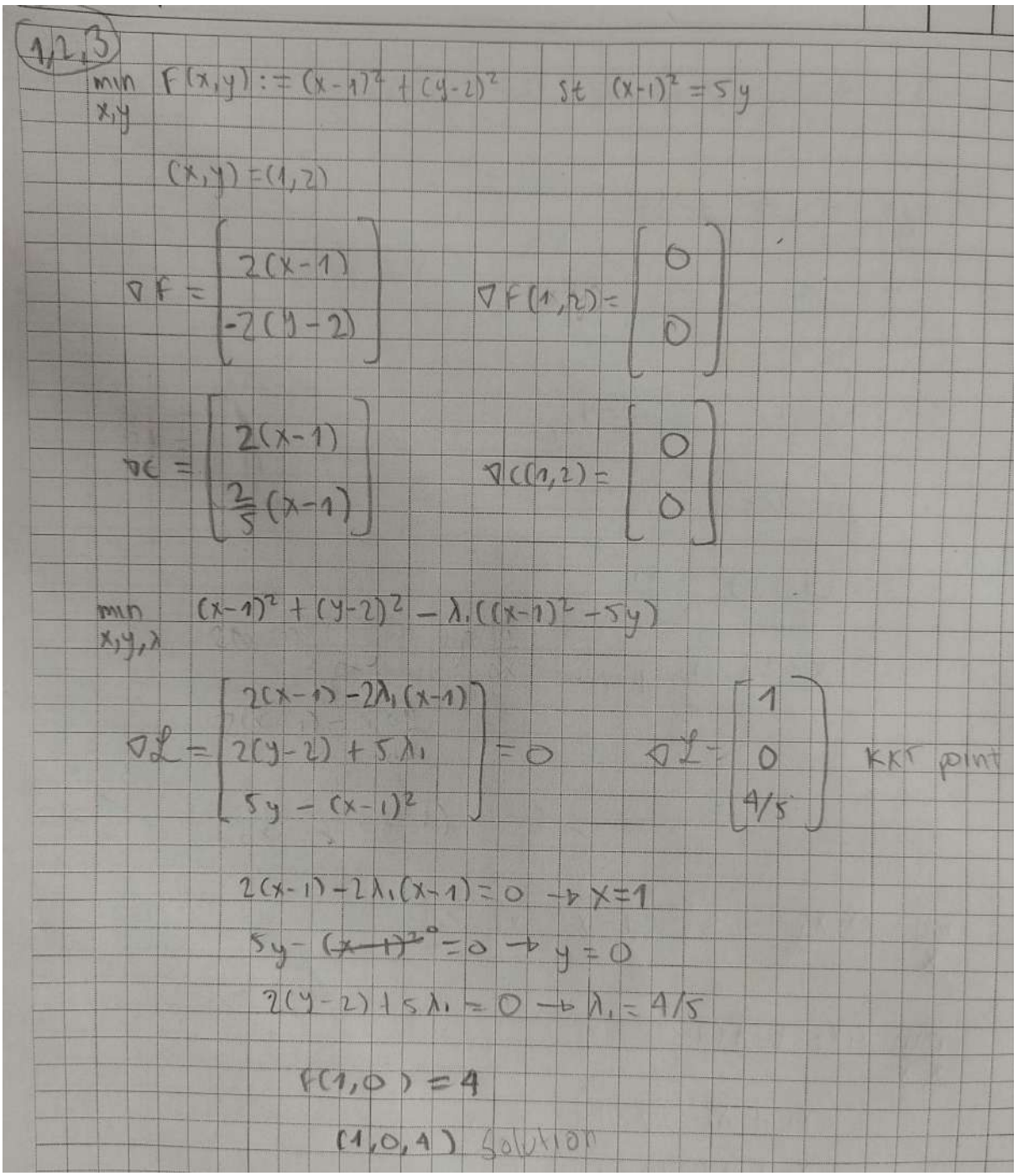


④ $(x-1)^2 = 5y \longrightarrow \min_y \; 5y + (y-2)^2$

$$\nabla f = 5 + 2(y-2)$$

$$5 + 2(y-2) = 0$$

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

$$(x-1)^2 = -\frac{1}{2}$$

$$x = \pm i\sqrt{\frac{1}{2}} + 1$$

no pueden ser solucion del primer problema por su dominio

⑤ $F(x) = x_1 x_2 \qquad \max_x \; x_1 x_2 \quad st \; 1 - x_2^2 - x_1^2 \geq 0$

$$\nabla f = \begin{bmatrix} x_2 \\ x_1 \end{bmatrix} \qquad \nabla C = \begin{bmatrix} -2x_1 \\ -2x_2 \end{bmatrix}$$

$$\max_{x,\lambda} \; x_1 x_2 - \lambda(1 - x_2^2 - x_1^2)$$

$$\nabla \mathcal{L} = \begin{bmatrix} x_2 - \lambda(-2x_1) \\ x_1 - \lambda(-2x_2) \\ 1 - x_2^2 - x_1^2 \end{bmatrix} = 0$$

$$x_2 + 2\lambda x_1 = 0$$

$$x_1 + 2\lambda x_2 = 0$$

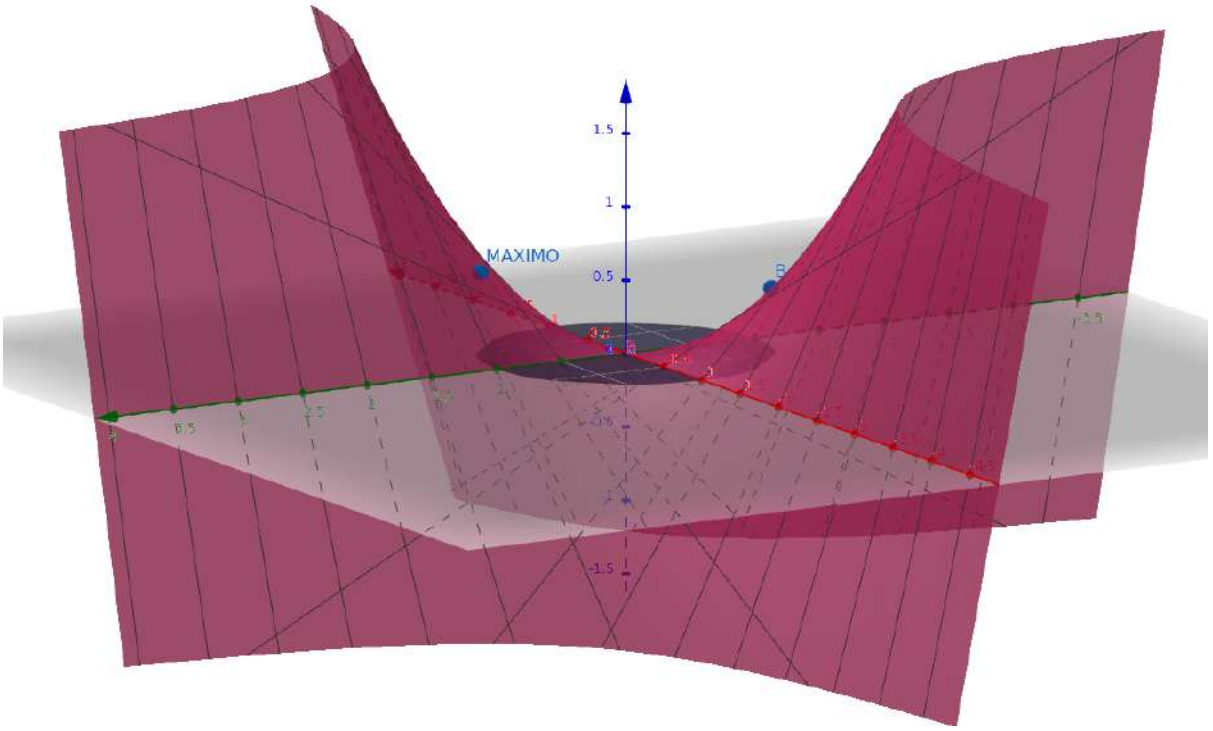
$$1 - x_2^2 - x_1^2 = 0$$

$$x_1 = x_2 = \pm\sqrt{\frac{1}{2}}$$

$$\lambda = -\frac{x_1}{2x_1} = -\frac{1}{2}$$

$\max \left(\sqrt{\frac{1}{2}}, \sqrt{\frac{1}{2}}\right)$

$$F\left(\begin{bmatrix} \sqrt{\frac{1}{2}} \\ \sqrt{\frac{1}{2}} \end{bmatrix}\right) = \frac{1}{2}$$


MAXIMO
1.5
1
0.5
-1.5