

Practica 3

Continuidad

Problema 1

¿En que puntos (x,y) en el plano son continuas las siguientes funciones?

a) $f(x, y) = \text{sen}(x + y)$

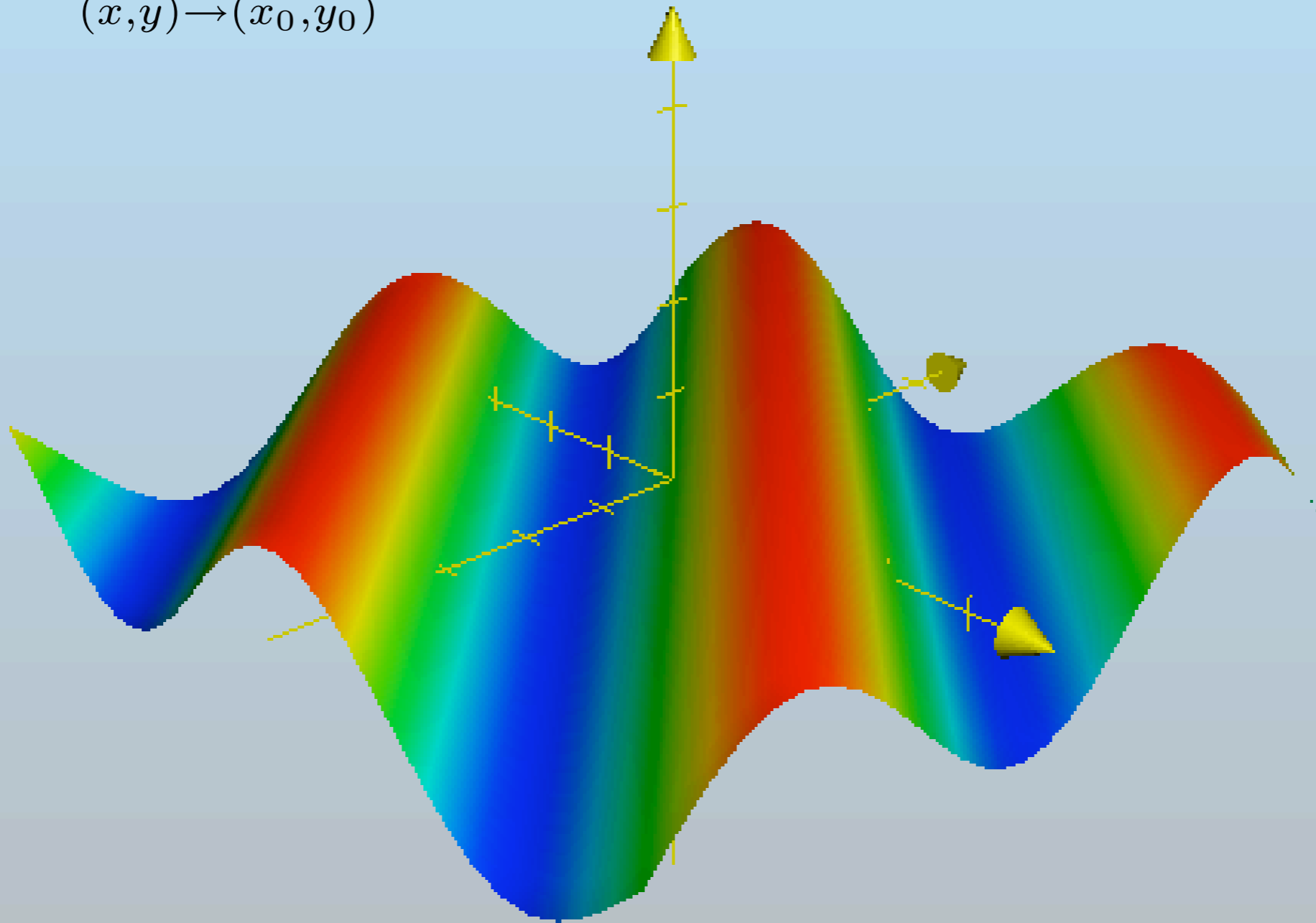
b) $f(x, y) = \ln(x^2 + y^2)$

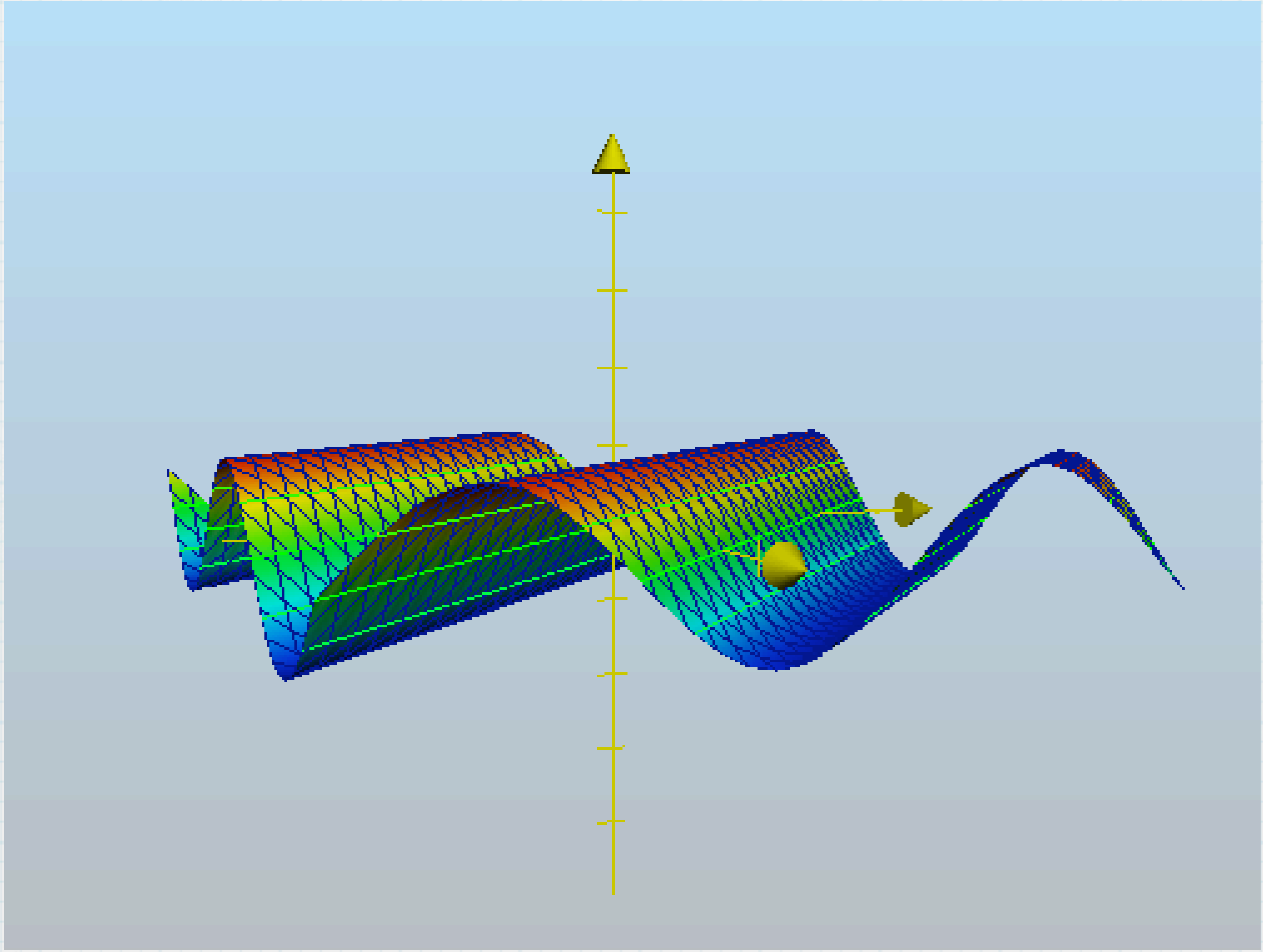
c) $g(x, y) = \text{sen}\left(\frac{1}{xy}\right)$

d) $g(x, y) = \frac{x + y}{2 + \cos(x)}$

a) Todo (x,y)

$$\lim_{(x,y) \rightarrow (x_0,y_0)} \text{sen}(x + y) = \text{sen}(x_0 + y_0)$$

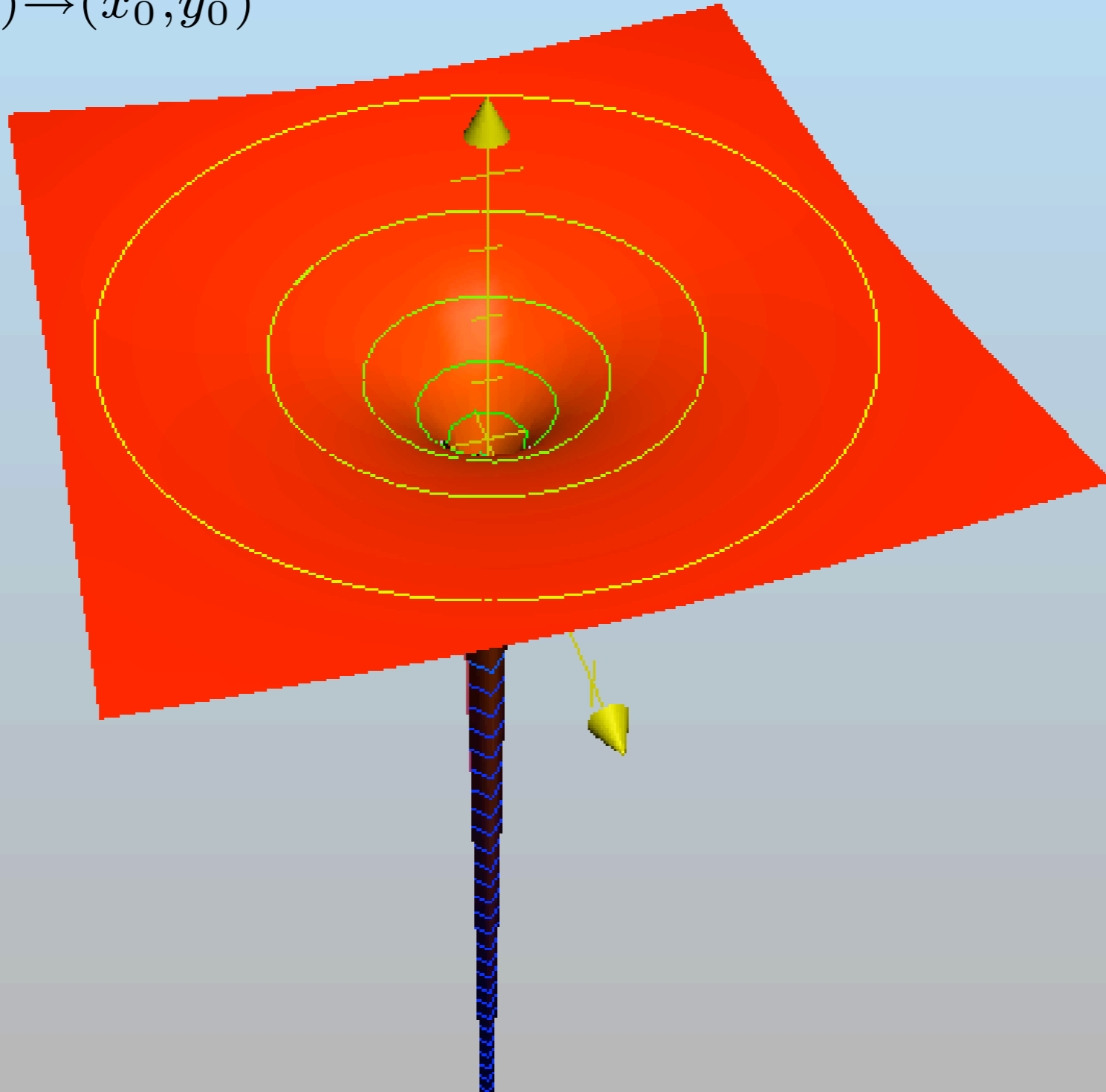


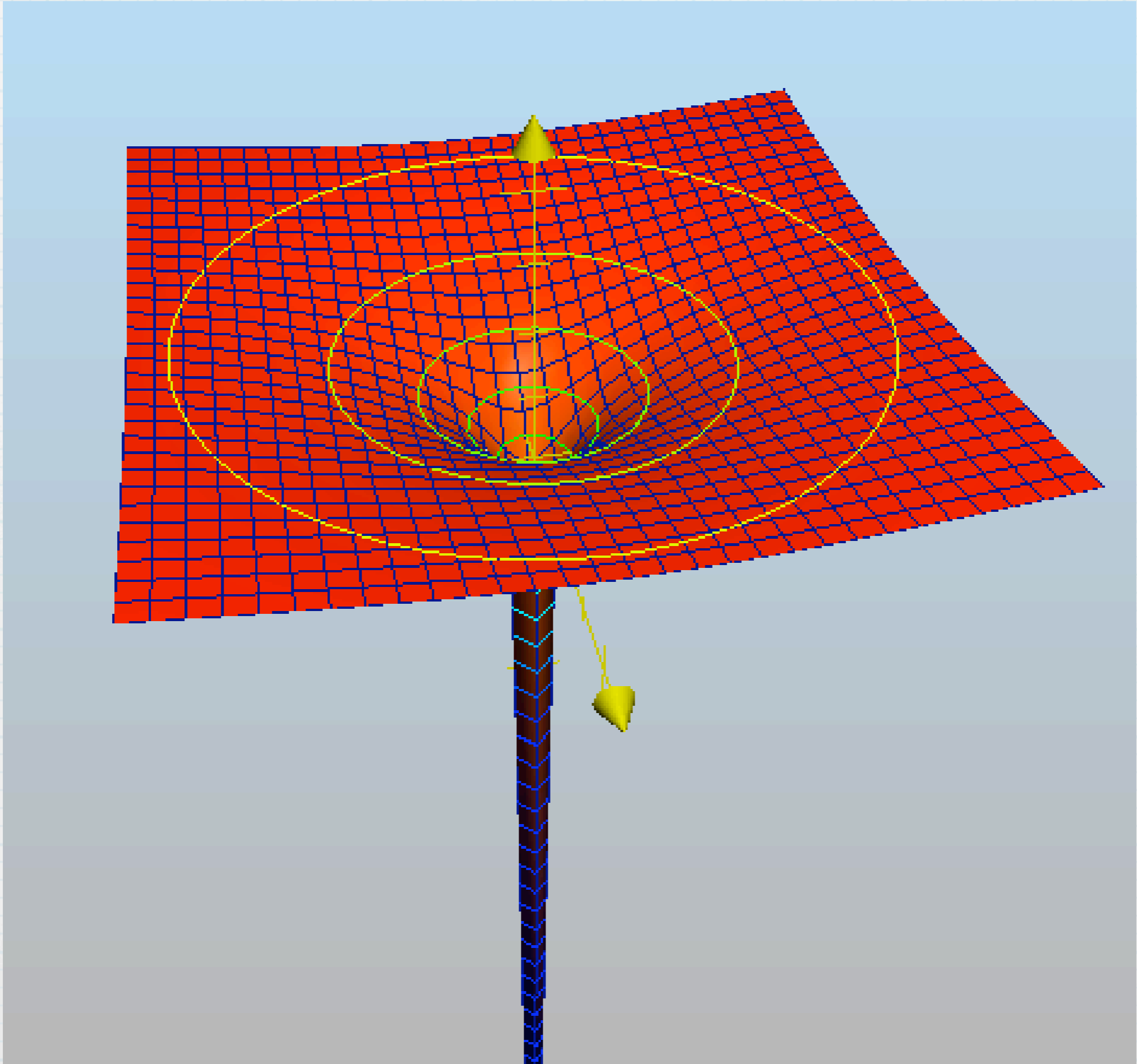


b)

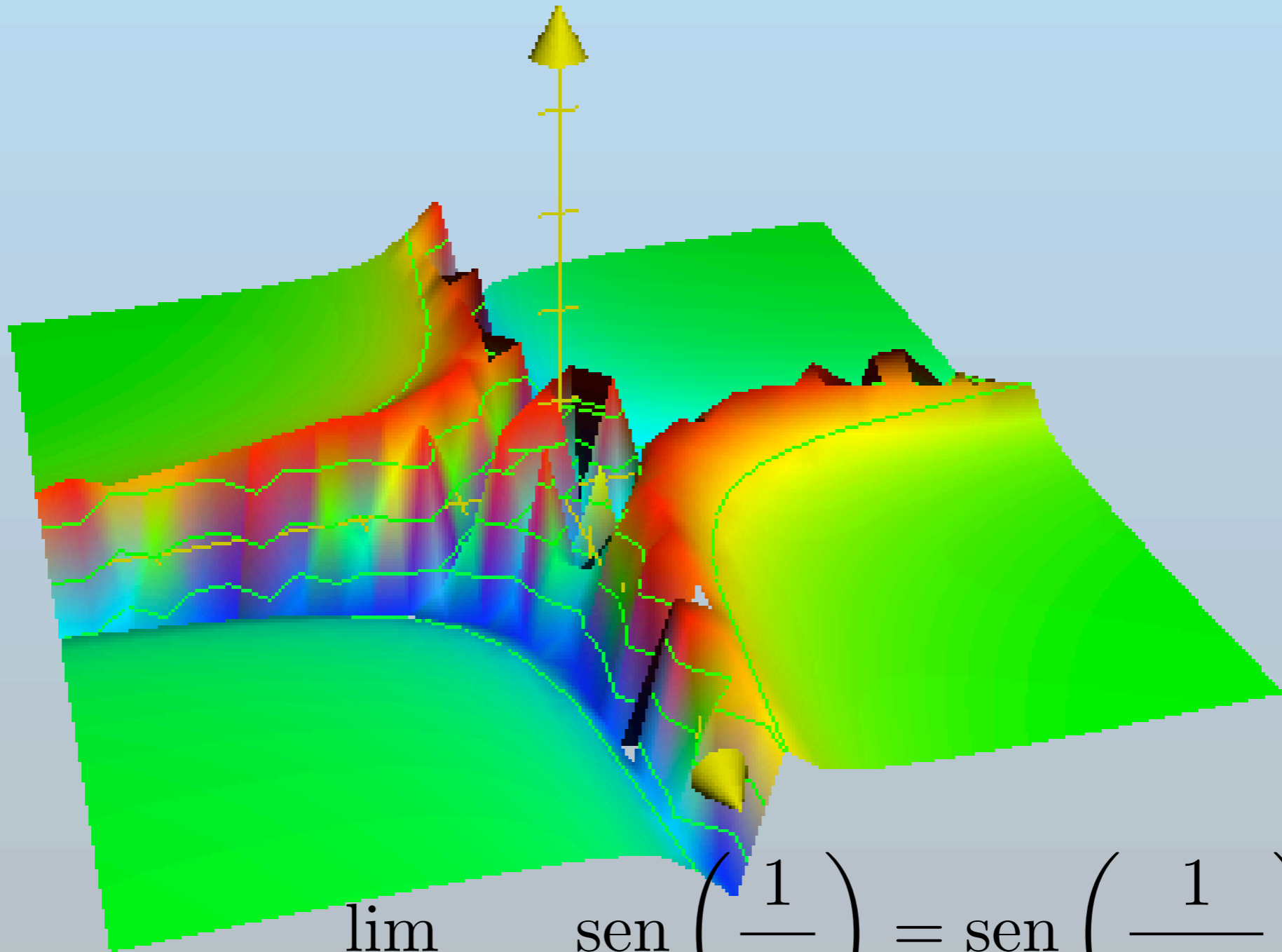
Todo (x,y) menos $(0,0)$

$$\lim_{(x,y) \rightarrow (x_0,y_0)} \ln(x^2 + y^2) = \ln(x_0^2 + y_0^2)$$

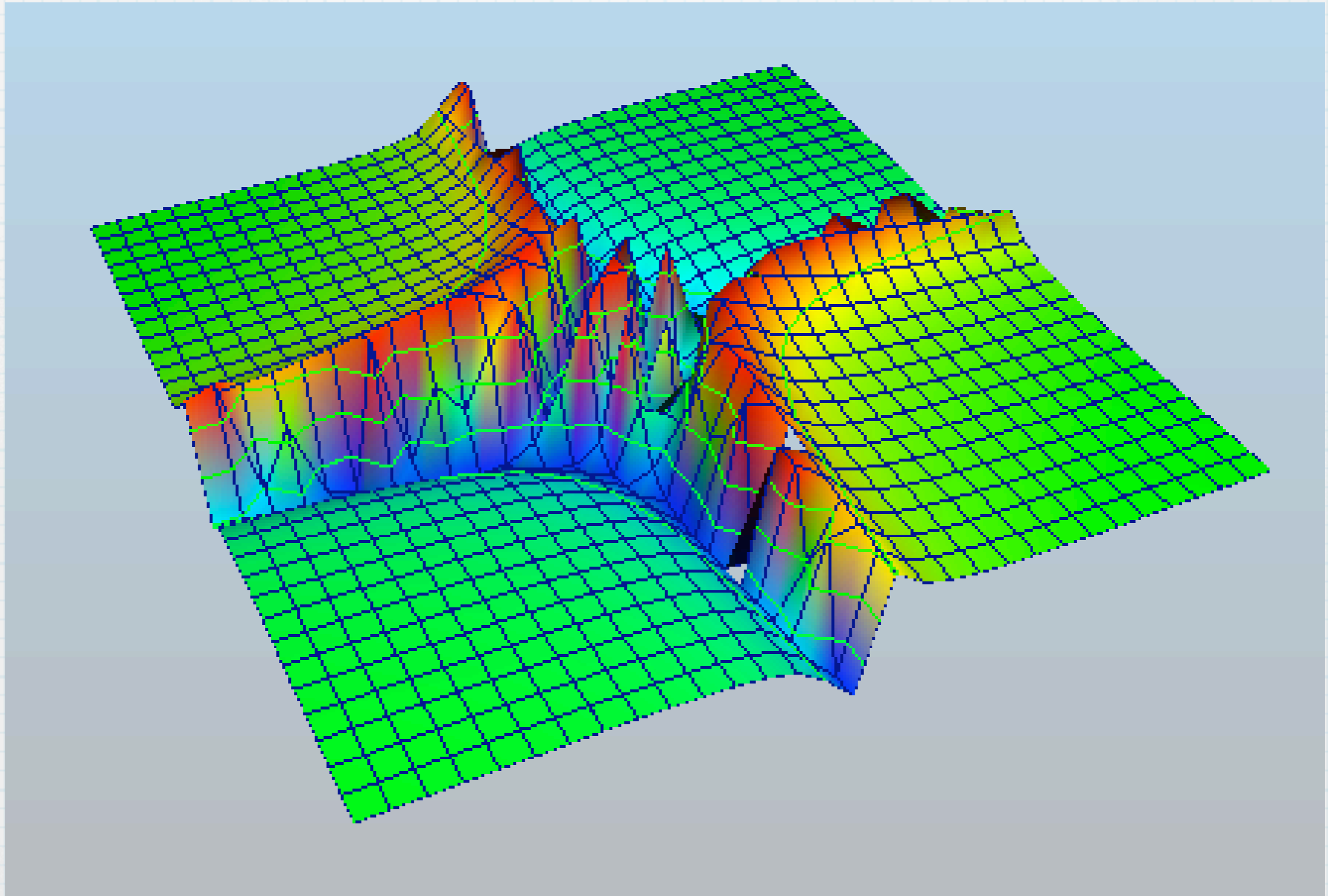


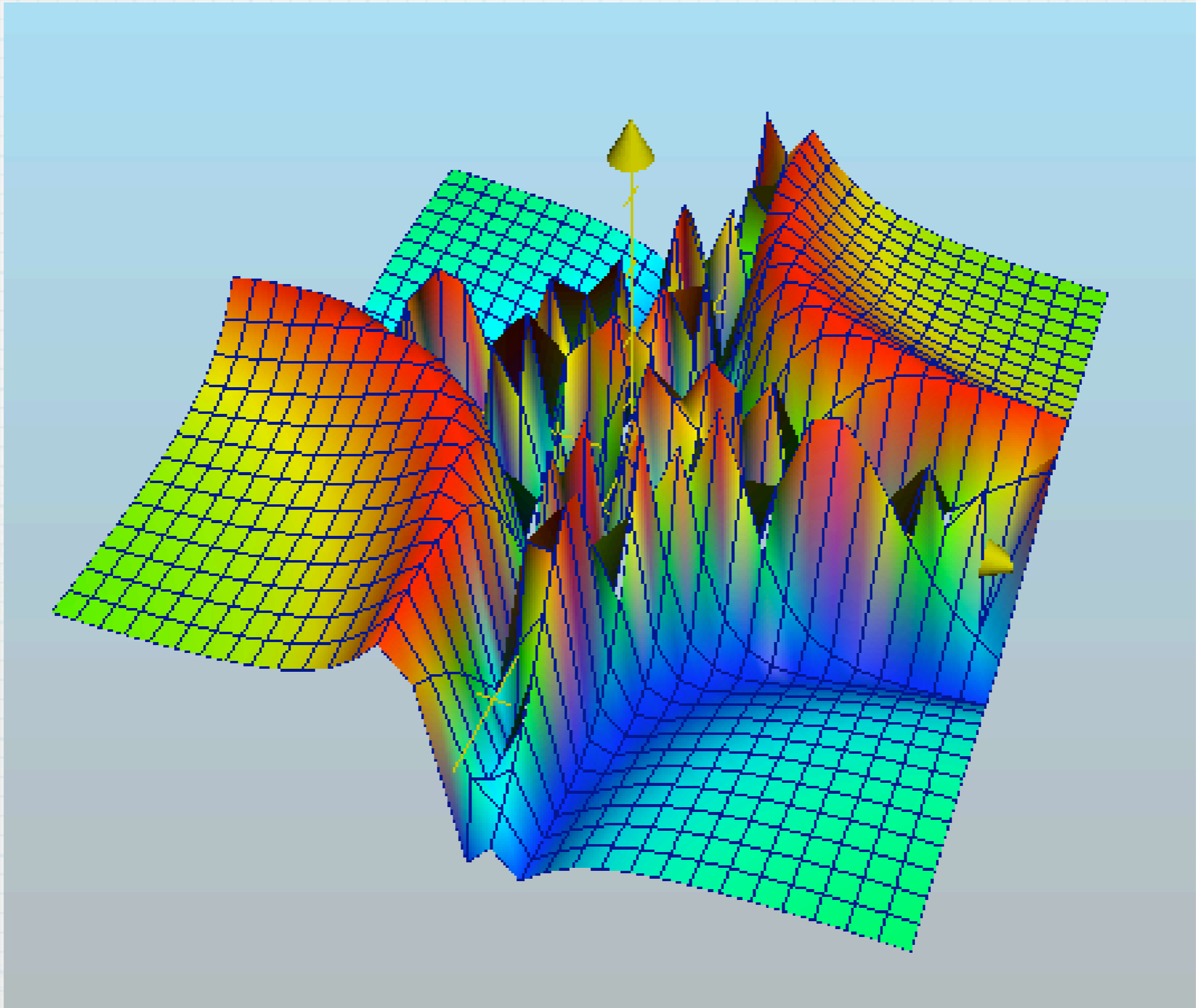


c) Todo (x,y) excepto $(x,0)$ y $(0,y)$



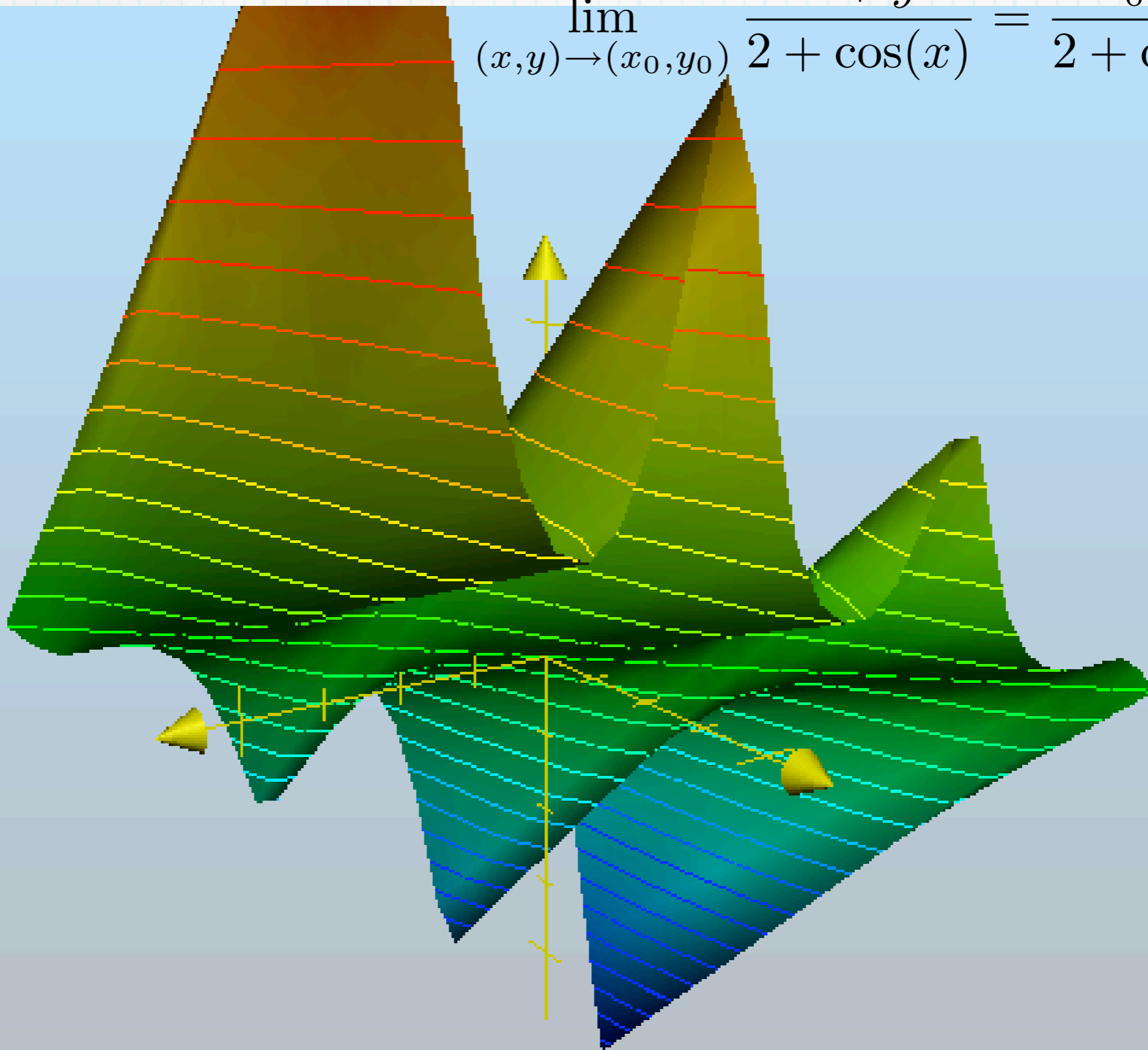
$$\lim_{(x,y) \rightarrow (x_0,y_0)} \sin\left(\frac{1}{xy}\right) = \sin\left(\frac{1}{x_0y_0}\right)$$

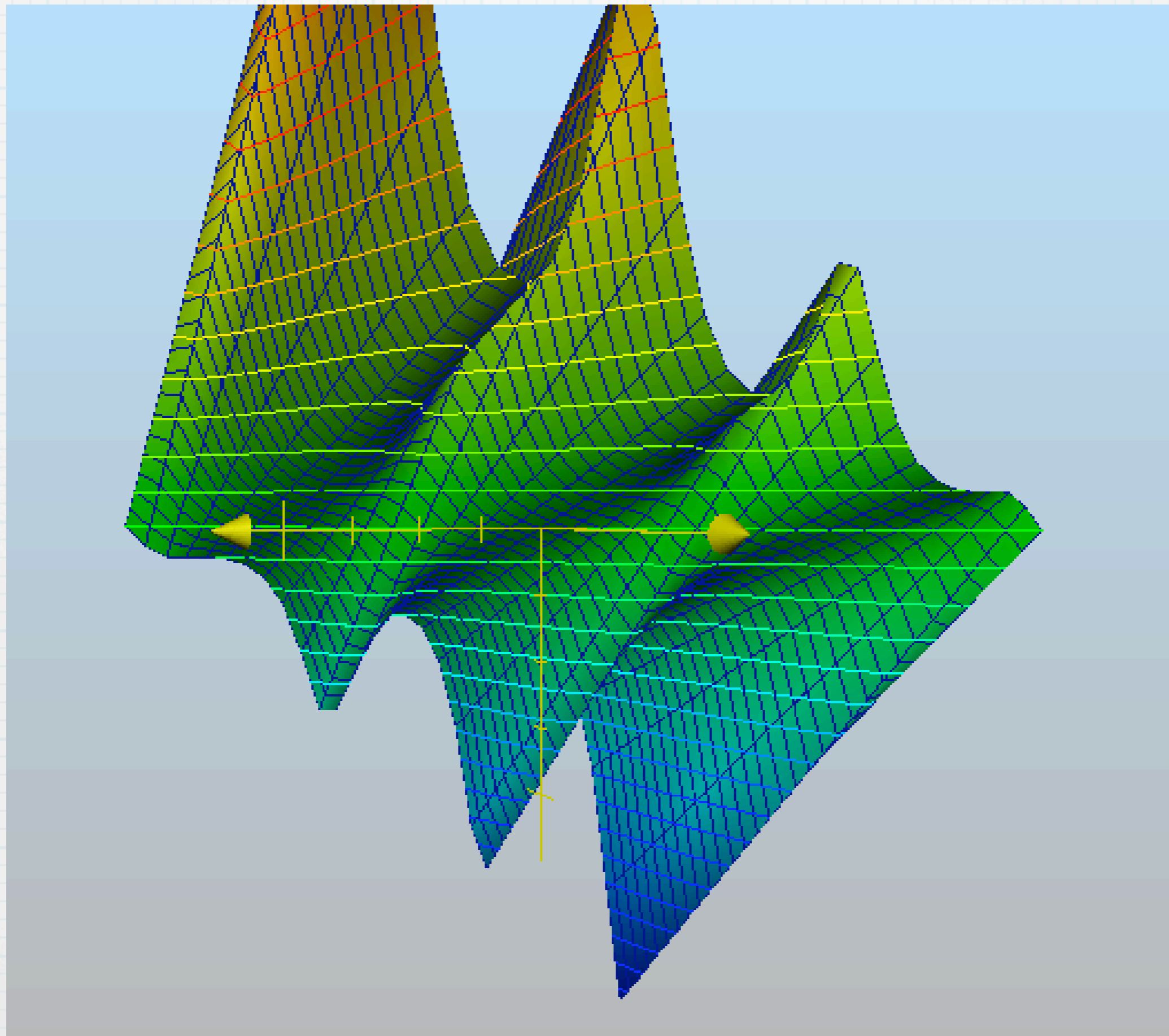


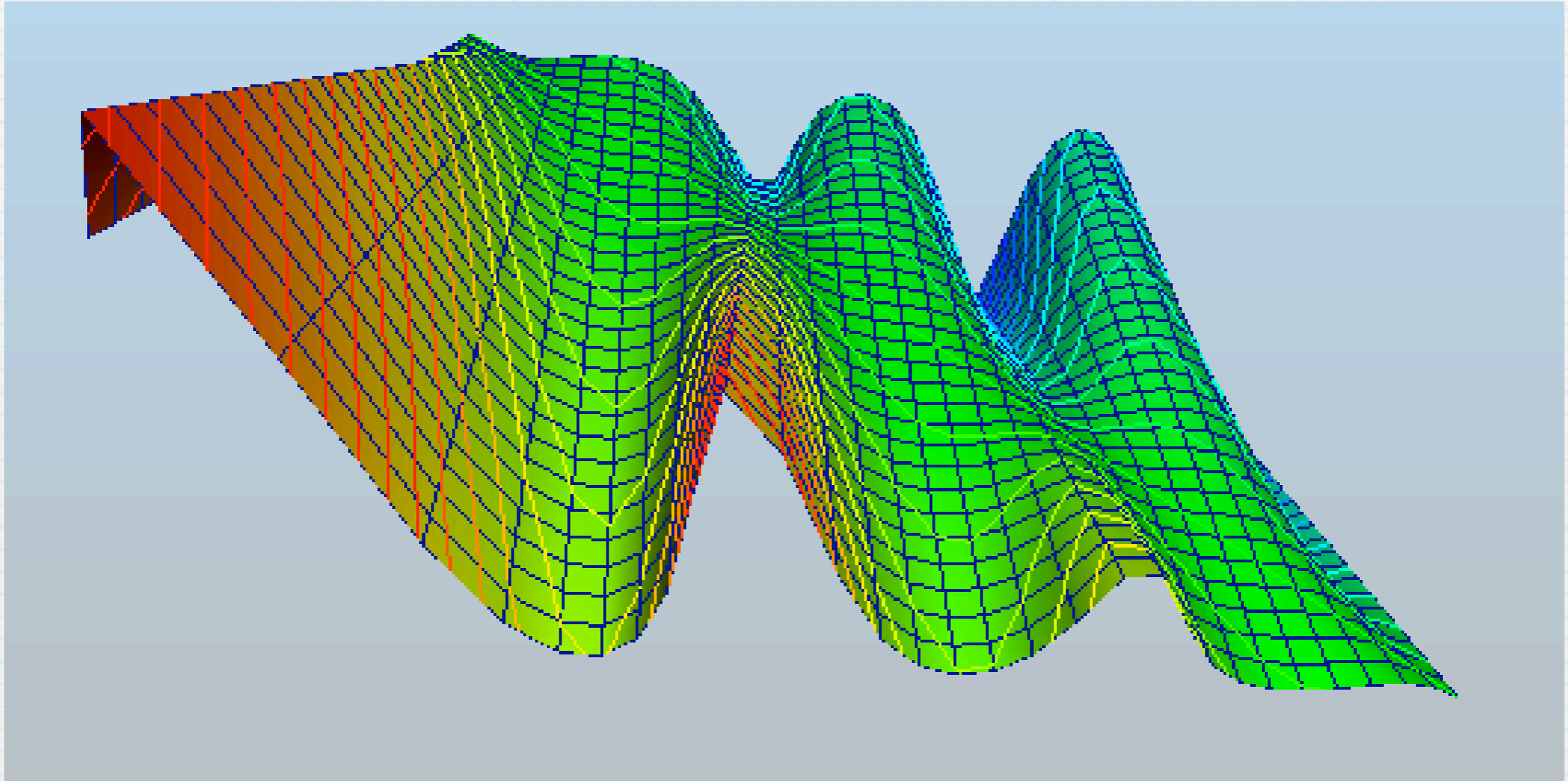


d) Todo (x,y)

$$\lim_{(x,y) \rightarrow (x_0,y_0)} \frac{x+y}{2+\cos(x)} = \frac{x_0+y_0}{2+\cos(x_0)}$$







Problema 2.

¿En que puntos (x,y,z) las siguientes funciones son continuas?

a) $f(x, y) = x^2 + y^2 - 2z^2$

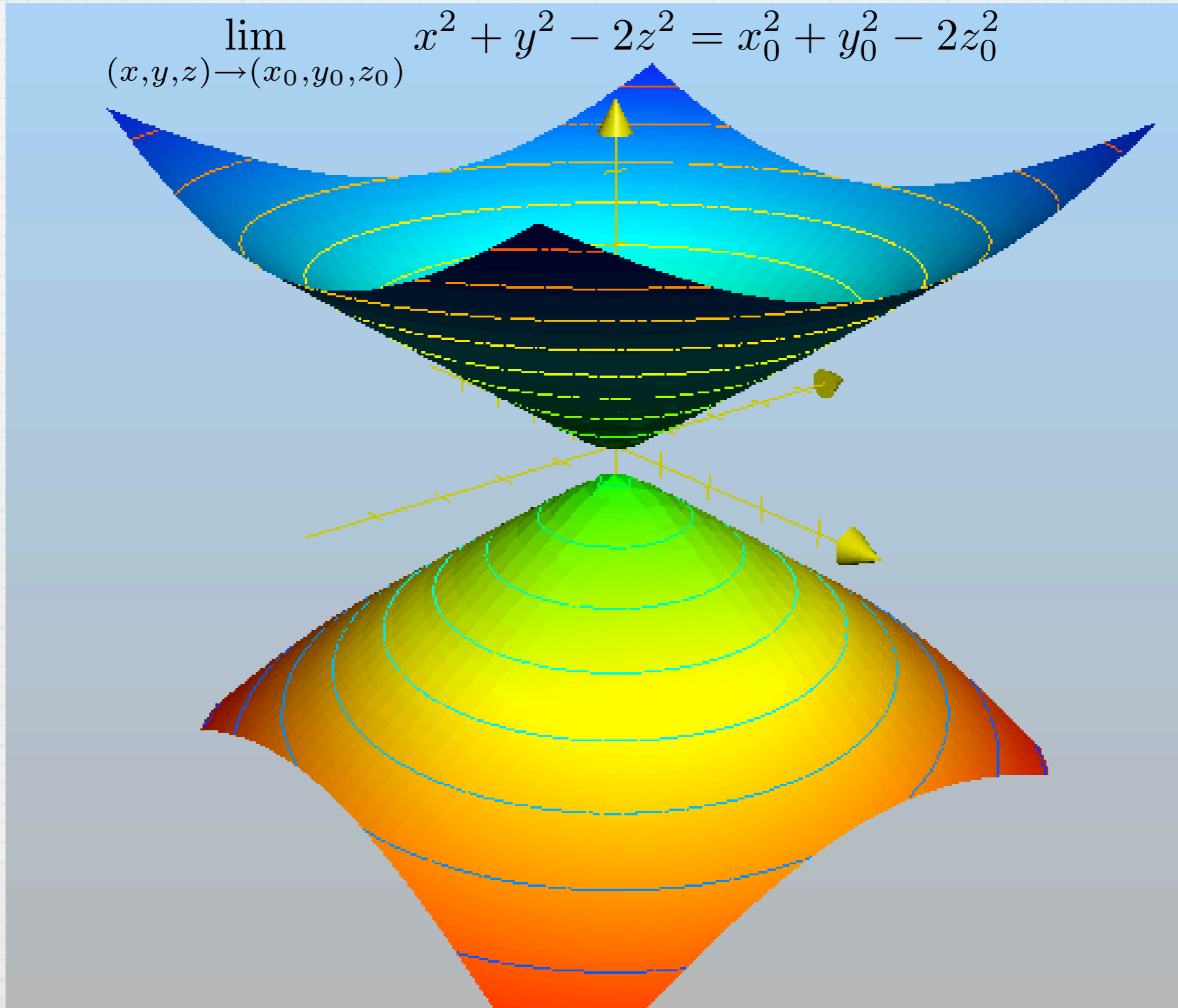
b) $f(x, y) = \sqrt{x^2 + y^2 - 1}$

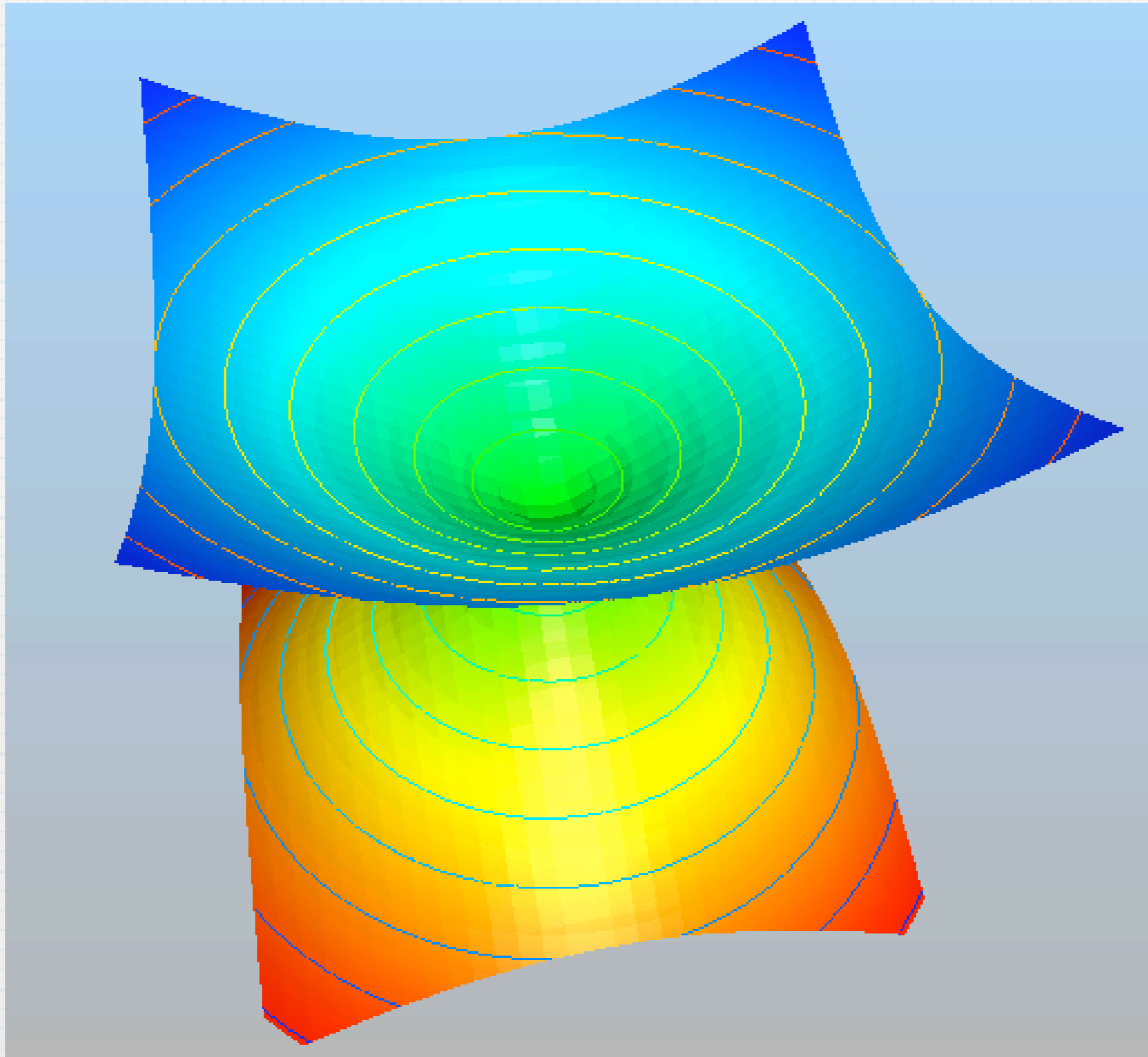
c) $h(x, y) = x y \operatorname{sen} \left(\frac{1}{z} \right)$

d) $g(x, y) = \frac{1}{x^2 + z^2 - 1}$

Ejercicio 1

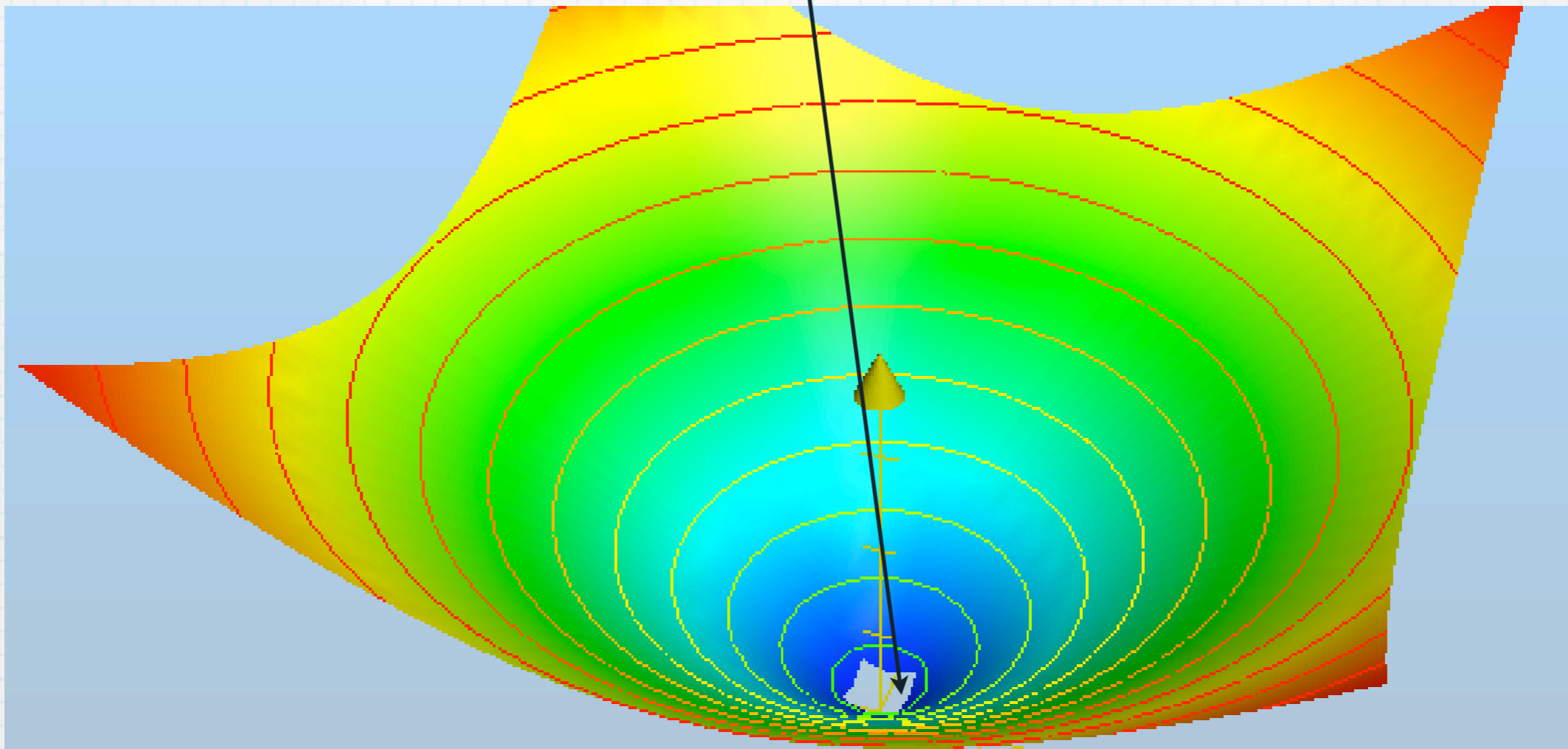
a) Todo (x,y,z)



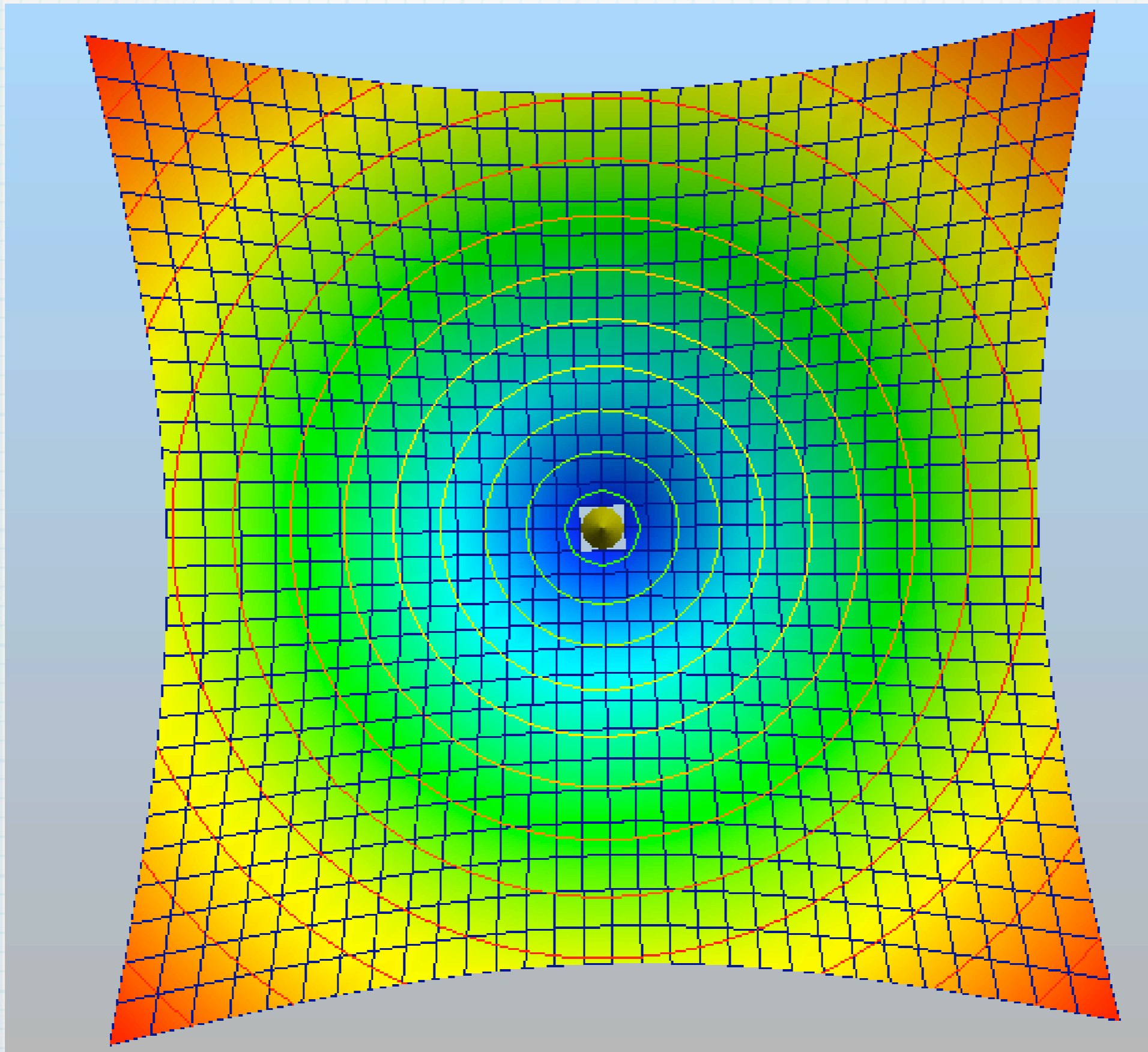


b) Todo (x,y,z) , excepto en el interior del cilindro

$$x_0^2 + y_0^2 = 1$$



$$\lim_{(x,y,z) \rightarrow (x_0,y_0,z_0)} \sqrt{x^2 + y^2 - 1} = \sqrt{x_0^2 + y_0^2 - 1}$$



c) Todo (x,y,z) tal que $z \neq 0$

$$\lim_{(x,y,z) \rightarrow (x_0,y_0,z_0)} x y \operatorname{sen} \left(\frac{1}{z} \right) = x_0 y_0 \operatorname{sen} \left(\frac{1}{z_0} \right)$$

