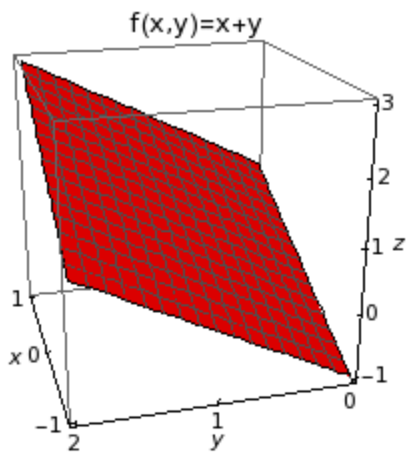
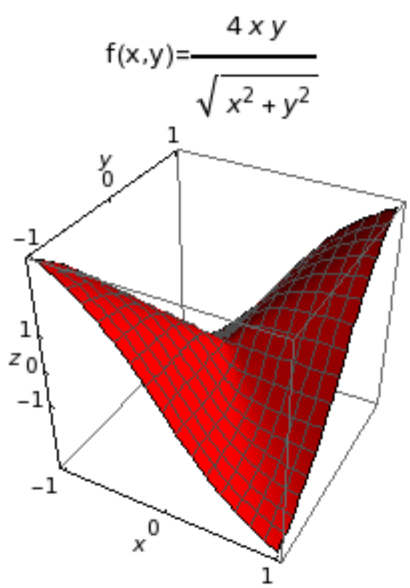
2

Exercício 2.1

a)

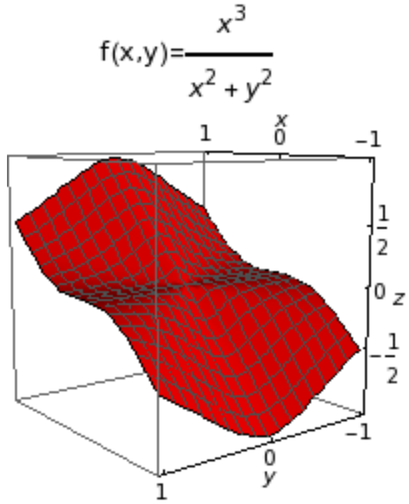


b)

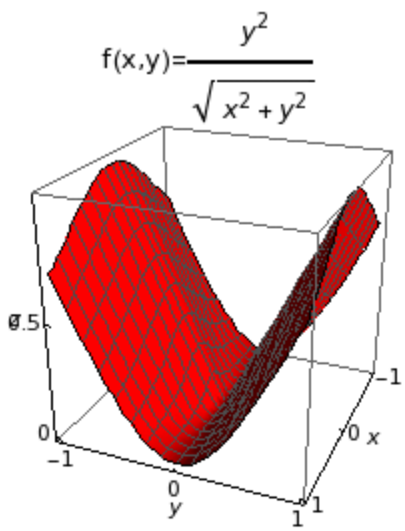


Exercício 2.2

a)

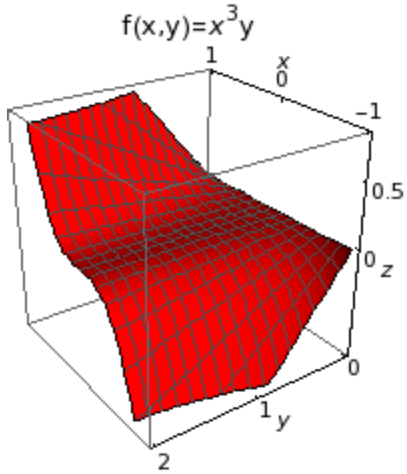


b)



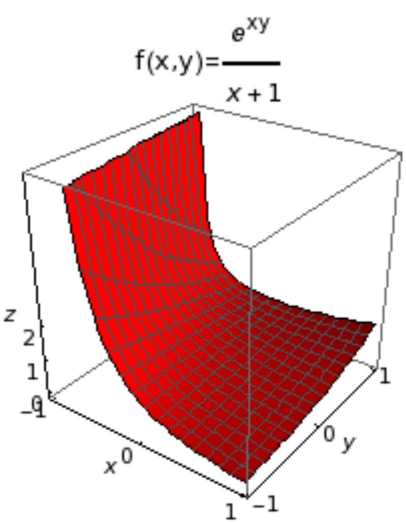
Exercício 2.3

a)



$$\lim_{(x,y)\to(0,1)} f(x, y) = 0$$

b)



$$\lim_{(x,y)\to(0,0)} f(x, y) = 1$$

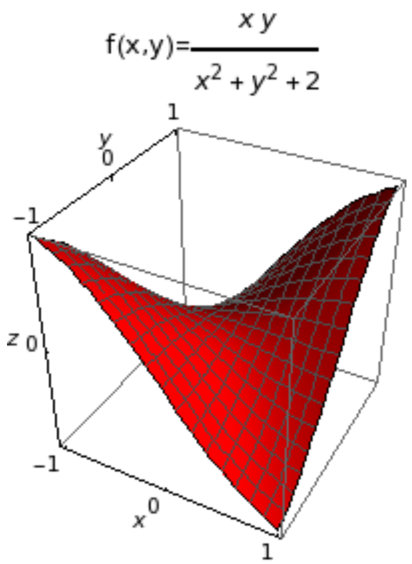
c)

$$\lim_{x\to 1} \left(x^2, e^x\right) = (1, e)$$

d)

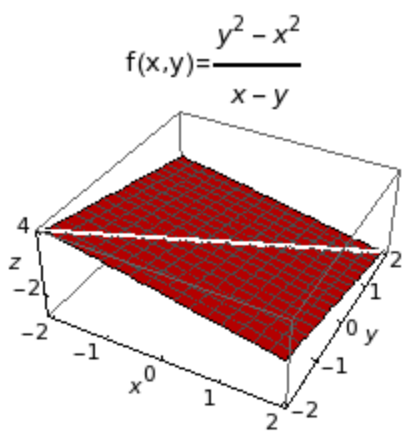
$$\lim_{(x,y)\to(0,0)} \left(\frac{\mathrm{Cos}[x]}{x^2 + y^2 + 1}, e^{x^2}\right) = (1, 1)$$

e)



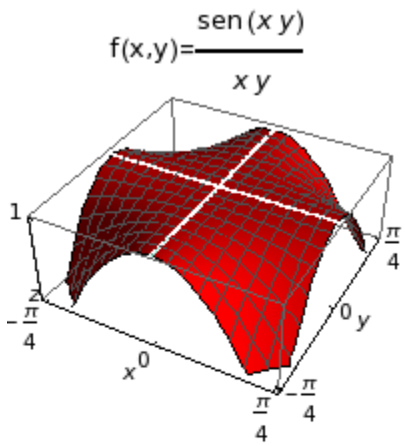
$$\lim_{(x,y)\to(0,0)} f(x, y) = 0$$

f)



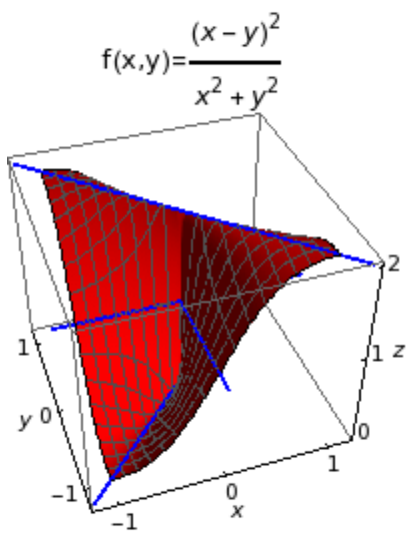
$$\lim_{(x,y)\to(1,1)} f(x, y) = -2$$

g)



$$\lim_{(x,y)\to(0,0)} f(x,y) = 1$$

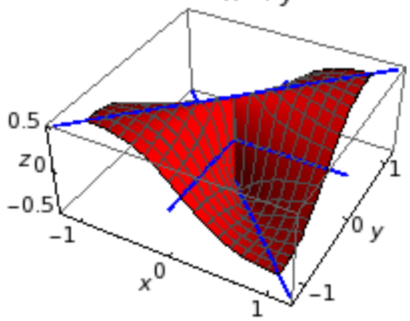
h)



Não existe $\lim_{(x,y)\to(0,0)} f(x,y)$

i)

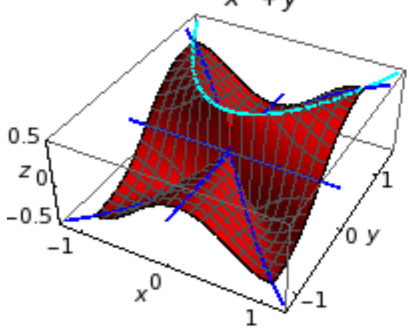
$$f(x,y)=\frac{x\,y}{x^2+y^2}$$



Não existe $\lim\limits_{(x,y)\to(0,0)} f(x,y)$

j)

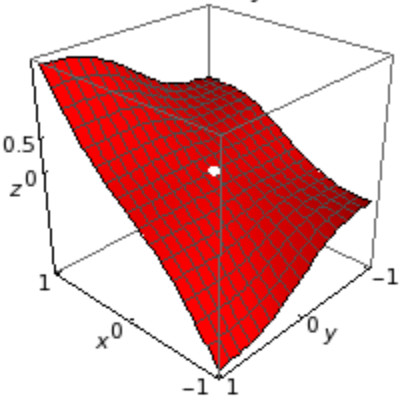
$$f(x,y)=\frac{x^2\,y}{x^4+y^2}$$



Não existe $\lim\limits_{(x,y)\to(0,0)} f(x,y)$

k)

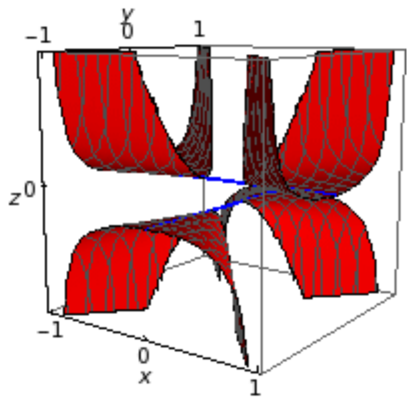
$$f(x,y)=\frac{x^3\,y}{x^2+y^2}+x$$



$$\lim_{(x,y)\to(0,0)} f(x, y) = 0$$

l)

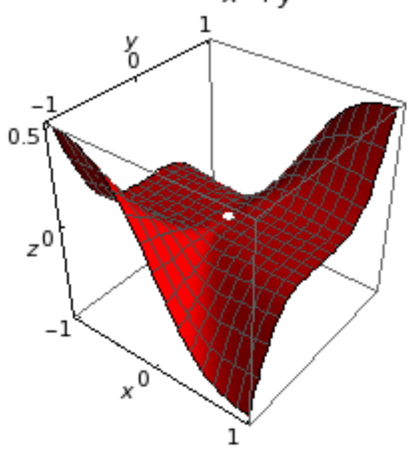
$$f(x,y)=\frac{y^2}{x^2-y^2}$$



Não existe $\lim_{(x,y)\to(0,0)} f(x, y)$

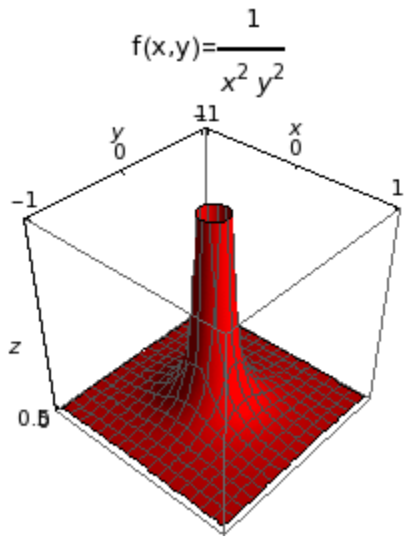
m)

$$f(x,y)=\frac{x\,y^5}{x^2+y^4}$$



$$\lim_{(x,y)\to(0,0)} f(x, y) = 0$$

n)



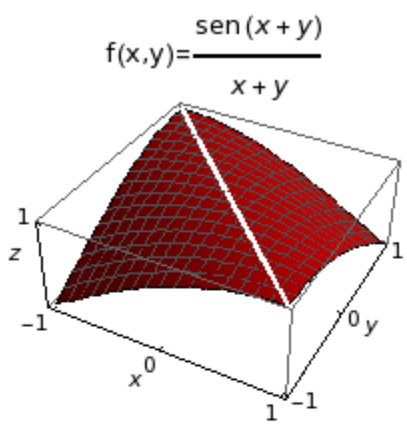
$$\lim_{(x,y)\to(0,0)} f(x, y) = +\infty$$

o)

$$\lim_{(x,y,z)\to(-1,1,0)} f(x, y, z) = (-1, 0)$$

Exercício 2.4

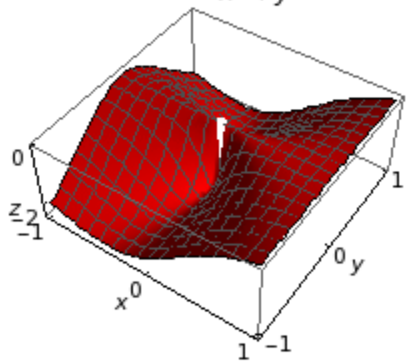
a)



$$f(0, 0) = 1$$

b)

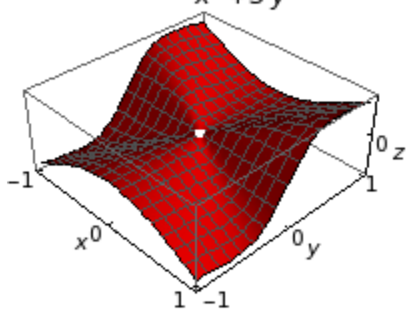
$$f(x,y)=\frac{2(x-1)y^2}{x^2+y^2}$$



Não admite prolongamento contínuo à origem

c)

$$f(x,y)=\frac{2x^2y}{x^2+3y^2}$$

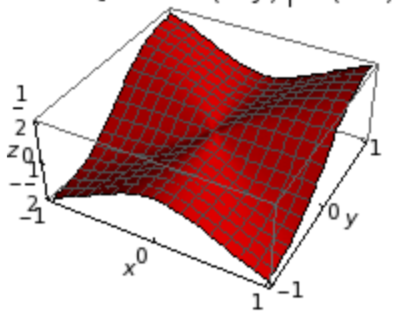


f (0, 0) = 0

Exercício 2.5

a)

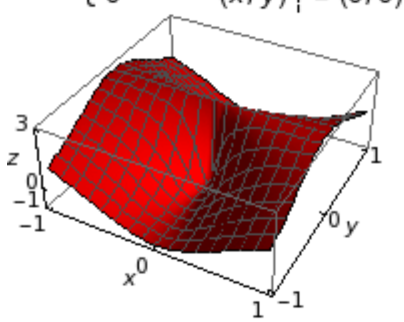
$$f(x,y)=\begin{cases} \dfrac{x^2 y}{x^2+y^2} & (x,y) \neq (0,0) \\ 0 & (x,y) = (0,0) \end{cases}$$



A função é contínua em $\mathbb{R}^2$

b)

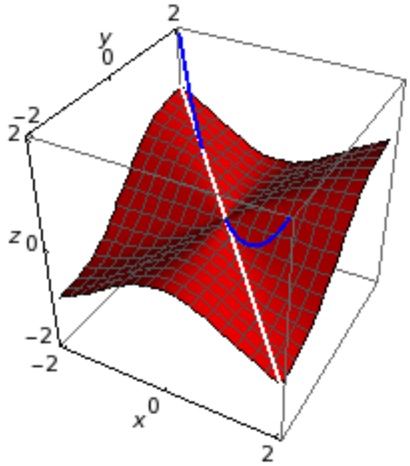
$$(x,y)=\begin{cases} \dfrac{3x^2-y^2}{x^2+y^2} & (x,y) \neq (0,0) \\ 0 & (x,y) = (0,0) \end{cases}$$



A função é contínua em $\mathbb{R}^2 \setminus \{(0,0)\}$

c)

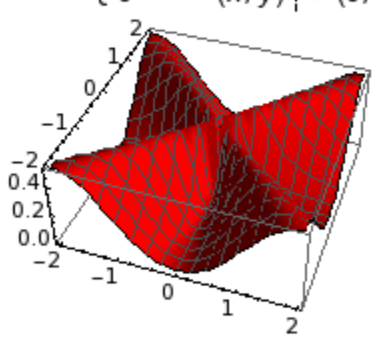
$$f(x,y)=\begin{cases} \dfrac{x^2 y}{x^2+y^2} & x \neq -y \\ \dfrac{x^2}{2} & x = -y \end{cases}$$



A função é contínua em $\{(x, y) \in \mathbb{R}^2 : x \neq -y\} \cup \{(0, 0), (-1, 1)\}$

d)

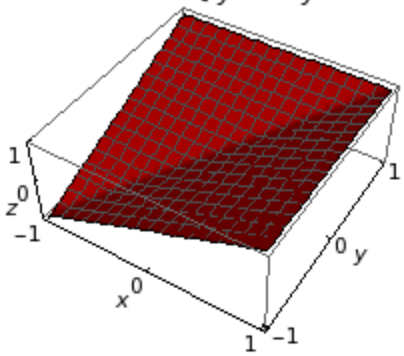
$$f(x,y)=\begin{cases} \dfrac{x^2 y^2}{x^4+y^4} & (x, y) \neq (0,0) \\ 0 & (x, y) = (0,0) \end{cases}$$



A função é contínua em $\mathbb{R}^2 \setminus \{(0, 0)\}$

e)

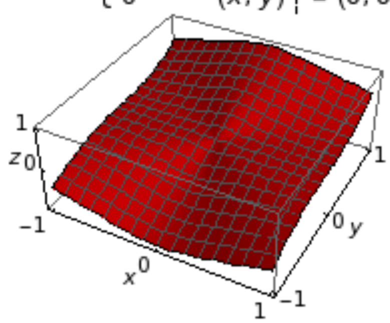
$$f(x,y)=\begin{cases} x & x \geq y \\ y & x < y \end{cases}$$



A função é contínua em $\mathbb{R}^2$

f)

$$f(x,y)=\begin{cases} \dfrac{y^3}{x^2+y^2} & (x,y) \neq (0,0) \\ 0 & (x,y) = (0,0) \end{cases}$$



A função é contínua em $\mathbb{R}^2$

g)

A função é contínua em $\mathbb{R}^3$

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