

>

実習19.2

> *with(student)* :

$$\begin{aligned} > f := (x, y) \rightarrow \exp(-(x + y - 2)^2) \\ &\quad f := (x, y) \mapsto e^{-(y+x-2)^2} \end{aligned} \tag{1}$$

$$\begin{aligned} > g := (x, y) \rightarrow x^3 - 3 \cdot x \cdot y + y^3 \\ &\quad g := (x, y) \mapsto y^3 + x^3 - 3yx \end{aligned} \tag{2}$$

(1)

$$\begin{aligned} > \text{with}(\text{student}) : \\ > \text{extrema}(f(x, y), g(x, y) = 0, \{x, y\}, 's') \\ &\quad \{1, e^{-1}\} \end{aligned} \tag{3}$$

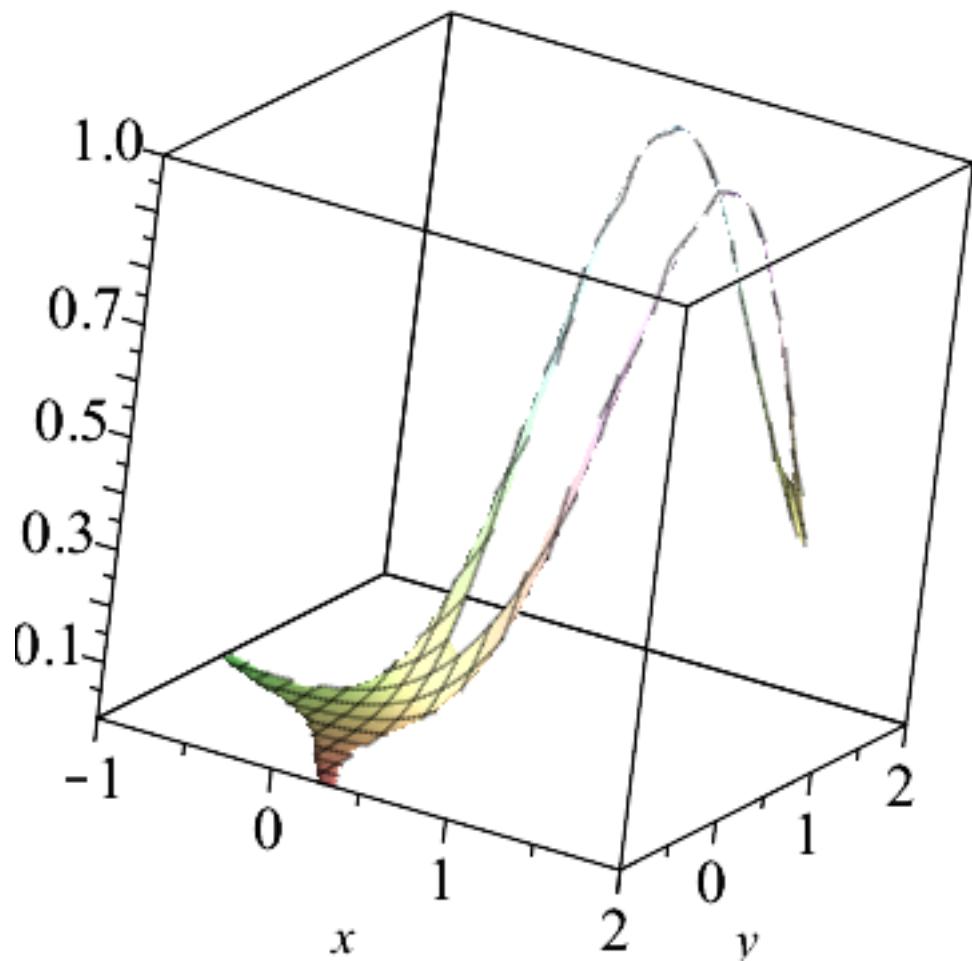
$$\begin{aligned} > s \\ &\quad \left\{ \left\{ x = \frac{2}{3}, y = \frac{4}{3} \right\}, \left\{ x = \frac{3}{2}, y = \frac{3}{2} \right\}, \left\{ x = \frac{4}{3}, y = \frac{2}{3} \right\} \right\} \end{aligned} \tag{4}$$

$$\begin{aligned} > f\left(\frac{2}{3}, \frac{4}{3}\right) \\ &\quad 1 \end{aligned} \tag{5}$$

$$\begin{aligned} > f\left(\frac{3}{2}, \frac{3}{2}\right) \\ &\quad e^{-1} \end{aligned} \tag{6}$$

$$\begin{aligned} > f\left(\frac{4}{3}, \frac{2}{3}\right) \\ &\quad 1 \end{aligned} \tag{7}$$

> *plot3d(piecewise(-0.2 < g(x, y) and g(x, y) < 0.2, f(x, y), none), x = -1 .. 2, y = -1 .. 2, grid = [100, 100])*



極大値 $f(2/3, 4/3) = f(4/3, 2/3) = 1$

極小値 $f(3/2, 3/2) = 1/e$

(2)

> $\text{extrema}(g(x, y), f(x, y) = 1, \{x, y\}, 's')$ { -1 } (8)

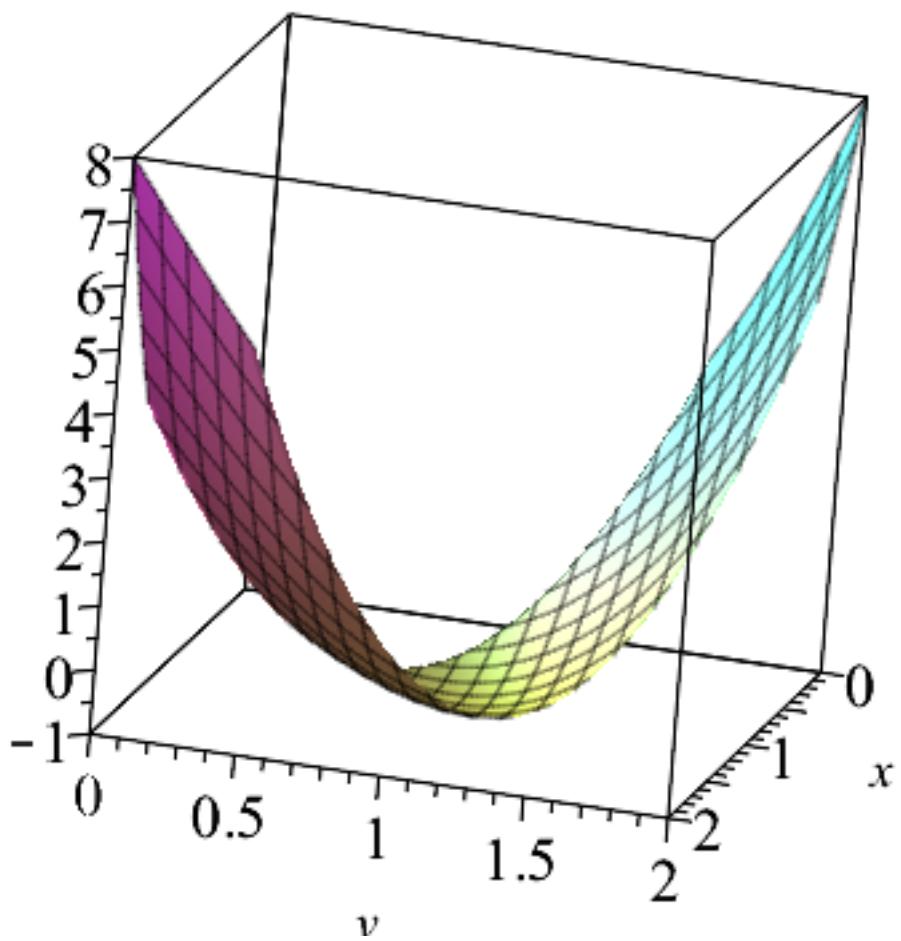
> s

{ { $x = 1, y = 1$ } } (9)

> $f(1, 1)$

1 (10)

> $\text{plot3d}(\text{piecewise}(0.8 < f(x, y) \text{ and } f(x, y) < 1.2, g(x, y), \text{none}), x = 0 .. 2, y = 0 .. 2, \text{grid} = [100, 100])$



極大値なし
極小値 $f(1,1)=1$

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