

Příprava na cvičení N 9

~ 11.1 d)  $f(x, y) = x^2 y$   $x^2 + y^2 = 1$

$$L(x, y, \lambda) = x^2 y + \lambda (x^2 + y^2 - 1) = x^2 y + x^2 \lambda + y^2 \lambda - \lambda$$

$$\frac{\partial f}{\partial x} = 2xy + 2x\lambda \quad \begin{cases} 2x(y + \lambda) = 0 \\ x^2 + 2y\lambda = 0 \\ x^2 + y^2 = 1 \end{cases}$$

$$\frac{\partial f}{\partial y} = x^2 + 2y\lambda$$

$$\frac{\partial L}{\partial \lambda} = x^2 + y^2 - 1$$

$$2x = 0$$

$$x = 0$$

$$0 + y^2 = 1$$

$$y = \pm 1$$

$$(0, 1) \quad (0, -1)$$

$$y + \lambda = 0$$

$$\lambda = -y$$

$$x^2 - 2y^2 = 0$$

$$x^2 = 2y^2$$

$$2y^2 + y^2 = 1$$

$$3y^2 = 1$$

$$y^2 = \frac{1}{3}$$

$$y = \pm \frac{1}{\sqrt{3}}$$

$$x^2 = 2 \cdot \frac{1}{3}$$

$$x = \pm \sqrt{\frac{2}{3}}$$

$$\left(\frac{1}{\sqrt{3}}, \sqrt{\frac{2}{3}}\right) \quad \left(\frac{1}{\sqrt{3}}, -\sqrt{\frac{2}{3}}\right)$$

$$\left(-\frac{1}{\sqrt{3}}, \sqrt{\frac{2}{3}}\right) \quad \left(-\frac{1}{\sqrt{3}}, -\sqrt{\frac{2}{3}}\right)$$

~ 11.4 c)  $x^2 y = 1$   $(0-x)^2 + (0-y)^2 = x^2 + y^2$

$$L(x, y, \lambda) = x^2 + y^2 + \lambda (x^2 y - 1) = x^2 + y^2 + x^2 y \lambda - \lambda$$

$$\frac{\partial f}{\partial x} = 2x + 2xy\lambda$$

$$\frac{\partial f}{\partial y} = 2y + x^2 \lambda$$

$$\frac{\partial L}{\partial \lambda} = x^2 y - 1$$

$$\begin{cases} 2x + 2xy\lambda = 0 \\ 2y + x^2 \lambda = 0 \\ x^2 y - 1 = 0 \end{cases}$$

$$2x(1 + y\lambda) = 0$$

$$2x = 0$$

$$x = 0$$

$$1 + y\lambda = 0$$

$$\lambda = -\frac{1}{y}$$

$$x^2 y = 1$$

$$x^2 = \frac{1}{y}$$

$$2y + \frac{1}{y} \cdot \left(-\frac{1}{y}\right) = 0$$

$$2y - \frac{1}{y^2} = 0$$

$$2y^3 = 1$$

$$y^3 = \frac{1}{2}$$

$$y = \frac{1}{\sqrt[3]{2}}$$

$$x^2 = \frac{1}{\frac{1}{\sqrt[3]{2}}} = \sqrt[3]{2}$$

$$x = \pm \sqrt[3]{2}$$

$$\left(\sqrt[3]{2}, \frac{1}{\sqrt[3]{2}}\right) \quad \left(-\sqrt[3]{2}, \frac{1}{\sqrt[3]{2}}\right)$$

není  
11.8  
11.11  
11.16