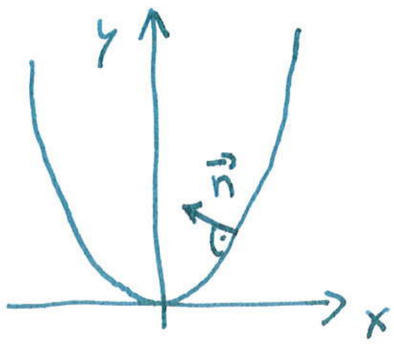
Normála plochy

2D



$$y = x^2$$

$$S(x,y) \equiv y - x^2 = 0$$

$$\vec{n} = \nabla S \equiv \left[\frac{\partial S}{\partial x}, \frac{\partial S}{\partial y}\right] \quad \text{normaliz.}$$

$$\frac{\partial S}{\partial x} = -2x \,, \quad \frac{\partial S}{\partial y} = 1$$

$$\vec{n} = \left[\frac{-2x}{\sqrt{4x^2+1}}, \frac{1}{\sqrt{4x^2+1}}\right]$$

pr. $\quad x = 0 \qquad \vec{n} = [0, 1]$

$\quad x = \sqrt{2} \qquad \vec{n} = \left[-\frac{2\sqrt{2}}{3}, \frac{1}{3}\right]$

$\quad x \to \infty \qquad \vec{n} \to [-1, 0]$

3D

$S(x,y,z) = 0 \quad$ definícia plochy

$\vec{n} = \nabla S \quad$ normaliz.

koma

$$W_c = \alpha x \underbrace{(x^2+y^2)}_{r^2}$$

$\alpha = a_c h'$

$x = r\cos\theta$

$y = r\sin\theta$

geom. aberace $(R=1)$

$$\delta x = \frac{\partial W_c}{\partial x} = \alpha(x^2+y^2) + \alpha 2x^2 = \alpha r^2 (1 + 2\cos^2\theta)$$

$$\cos(2\theta) = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1$$

$$\delta x = 2\alpha r^2 + \alpha r^2 \cos 2\theta$$

$$\delta y = \alpha 2xy = \alpha r^2 2\cos\theta\sin\theta = \alpha r^2 \sin 2\theta$$

$$\boxed{(\delta x - 2\alpha r^2)^2 + \delta y^2 = \alpha^2 r^4}$$