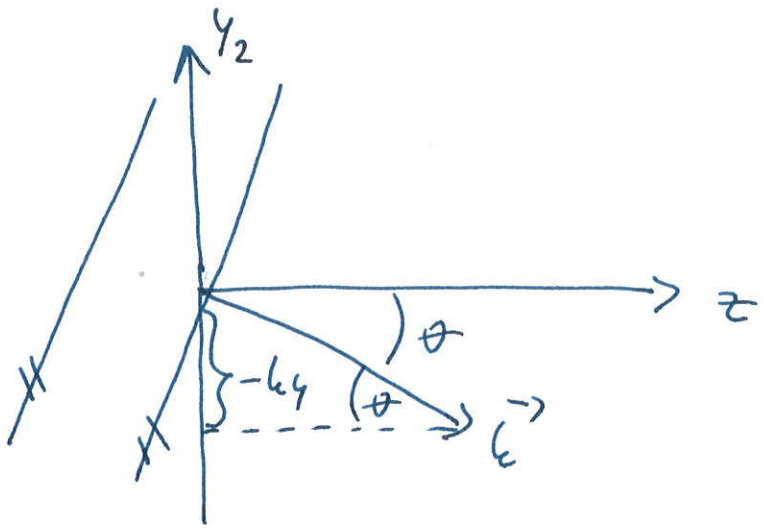
mimoosová holografie

nakloněná rovinná vlna



$$U_r(x_2, y_2) = e^{-i 2\pi \alpha y_2} = e^{i k_y y_2}$$

$$2\pi\alpha = -k_y = \frac{2\pi}{\lambda} \sin\theta$$

$$\boxed{\alpha = \frac{\sin\theta}{\lambda}}$$

Skálování

$$H\left(\frac{x_2}{\lambda f}, \frac{y_2}{\lambda f}\right) \xrightarrow{\mathcal{F}^{-1}} h(\lambda f f_x, \lambda f f_y)\Big|_{f_x = \frac{x_3}{\lambda f},\, f_y = \dots}$$

$$= h(x_3, y_3)$$

$$e^{i 2\pi \alpha y_2} \xrightarrow{\mathcal{F}^{-1}} \delta(f_x, f_y + \alpha)\Big|_{f_x = \frac{x_3}{\lambda f},\, f_y = \dots}$$

$$= \delta\left(\frac{x_3}{\lambda f}, \frac{y_3}{\lambda f} + \alpha\right) \propto \delta(x_3, y_3 + \alpha \lambda f)$$

2x konvoluce

$$h(x) * \delta(x+a) \equiv \int h(\xi)\,\delta(x-\xi+a)\,d\xi = h(x+a)$$

proto

$$h(x_3, y_3) * g(x_3, y_3) * \delta(x_3, y_3 + \alpha\lambda f)$$

$$= g(x_3, y_3) * h(x_3, y_3) * \delta(x_3, y_3 + \alpha\lambda f)$$

$$= g(x_3, y_3) * h(x_3, y_3 + \alpha\lambda f)$$

$$= \iint g(\xi, \eta)\, h(x_3 - \xi, y_3 - \eta + \alpha\lambda f)\, d\xi\, d\eta$$

$$= \left[g(x_3, y_3) * h(x_3, y_3) \right]_{y_3 \to y_3 + \alpha\lambda f}$$

stíněná konvoluce v bodě $y_3 = -\alpha\lambda f$