OTF

$$I_i(u,v) = \iint |h(u-\xi, v-\eta)|^2 I_g(\xi,\eta)\,d\xi\,d\eta$$

$$\Downarrow$$

$$\mathcal{F}\{I_i\} = \mathcal{F}\{|h|^2\}\,\mathcal{F}\{I_g\} \qquad (1)$$

$$\mathcal{F}_0\{I_i\} = \mathcal{F}_0\{|h|^2\}\,\mathcal{F}_0\{I_g\} \qquad (2)$$

kde $\mathcal{F}_0\{\cdot\} = \mathcal{F}\{\cdot\}\big|_{f_x=0,\, f_y=0}$

z (1) a (2) $\Rightarrow$ $$\underbrace{\frac{\mathcal{F}\{I_i\}}{\mathcal{F}_0\{I_i\}}}_{G_i} = \underbrace{\frac{\mathcal{F}\{|h|^2\}}{\mathcal{F}_0\{|h|^2\}}}_{\mathcal{H}}\,\underbrace{\frac{\mathcal{F}\{I_g\}}{\mathcal{F}_0\{I_g\}}}_{G_g}$$

$$\Downarrow$$

$$\boxed{G_i = \mathcal{H}\, G_g}$$

souvislost $P \longleftrightarrow \mathcal{H}$

$$P(\lambda z_p f_x) * P(\lambda z_p f_x) \quad \text{... četí. korelace}$$

$$= \int P(\lambda z_p \xi)\, P^*[\lambda z_p(\xi - f_x)]\, d\xi$$

$$= \int P(\underbrace{\lambda z_p \xi}_{\xi'})\, P^*(\lambda z_p \xi - \lambda z_p f_x)\, d\xi$$

$$= \frac{1}{\lambda z_p} \int P(\xi')\, P^*(\xi' - \lambda z_p f_x)\, d\xi$$

$$x = \xi' - \frac{\lambda z_p f_x}{2}$$

$$= \frac{1}{\lambda z_p} \int P\left(x + \frac{\lambda z_p f_x}{2}\right) P^*\left(x - \frac{\lambda z_p f_x}{2}\right) dx$$

$$P(0) * P(0) = \frac{1}{\lambda z_p} \int |P(x)|^2\, dx$$

vlastnosti OTF (1D)

① $\mathcal{H}(0) = 1$ plyne z def.

② $\mathcal{H}(-f_x) = \mathcal{H}(f_x)$ plyne z def.

$f_x \leftrightarrow -f_x \Rightarrow P \leftrightarrow P^*$

③ $|\mathcal{H}(f_x)| \leq |\mathcal{H}(0)|$

Schwarz. nerovnost

$$\boxed{\left| \int X(x)\, Y(x)\, dx \right|^2 \leq \int |X(x)|^2 dx \int |Y(x)|^2 dx}$$

$$X = P\left(x + \frac{\lambda z_p f_x}{2}\right)$$

$$Y = P^*\left(x - \frac{\lambda z_p f_x}{2}\right)$$

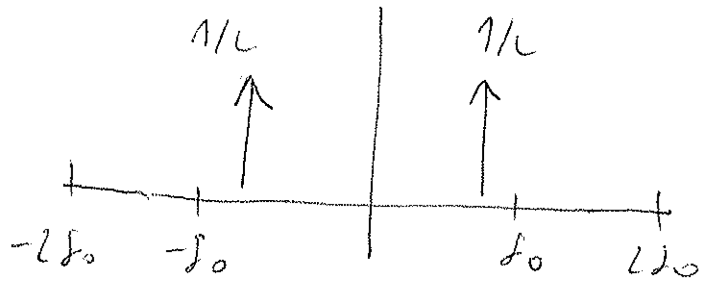
$$\int_{-\infty}^{\infty} \left| P\left(x + \frac{\lambda z_p f_x}{2}\right) \right|^2 dx = \int_{-\infty}^{\infty} |P(x)|^2 dx$$

koherentní vs nekoh.

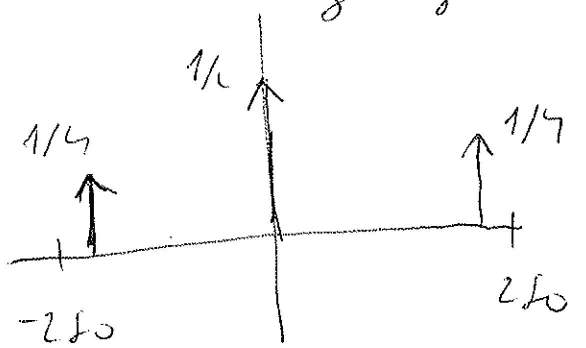
osvity $\qquad t_A = \cos 2\pi \bar{f} \xi \qquad \frac{f_0}{2} < \bar{f} < f_0$

$\boxed{\text{koh}}$ spektrum U_g $\qquad \boxed{\text{nekoh}}$

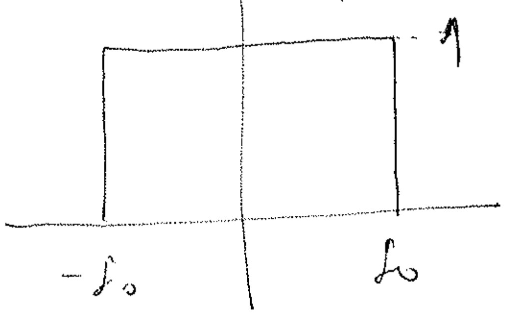
G_g



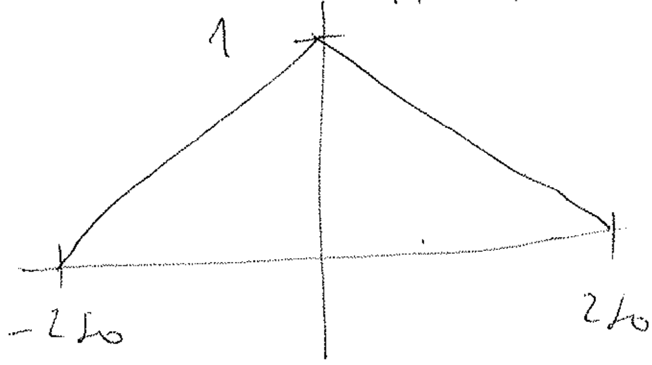
$G_g * G_g$



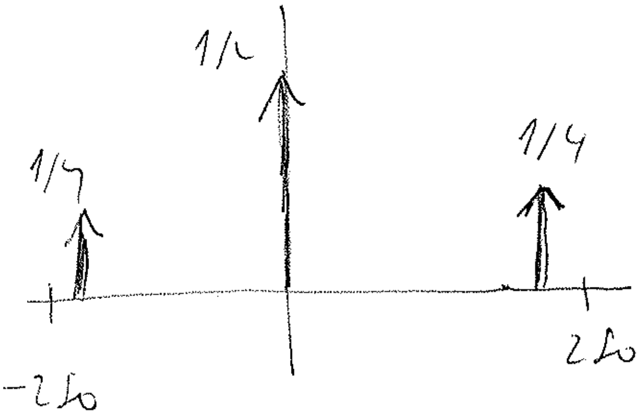
H



H * H



$\mathcal{F}\{I_i\} = (G_g H) * (G_g H)$



$\mathcal{F}\{I_i\} = (G_g * G_g)(H * H)$