2-D Wiener Deconvolution Filter

f_11-19.MCD

January 1, 1995

$N := 16 \quad u := 0..N \quad v := 0..N \quad A := 30 \quad N0 := 1 \quad C := 1 \quad \sigma := .25 \cdot N \quad \tau := .5 \cdot N \quad fc := .6 \cdot N$

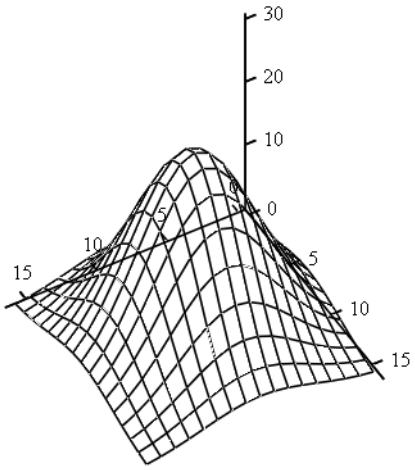
Define signal and noise spectra and the MTF:

$$Ps_{u,v} := A \cdot \exp\left[\frac{-(u-\tau)^2 - (v-\tau)^2}{2 \cdot \sigma^2}\right] \qquad Pn_{u,v} := N0 \qquad Pn_{0,0} := 0$$

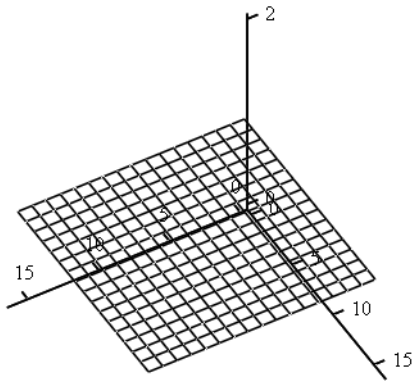
$$OTF(u,v) := \left(\frac{1}{.571}\right) \cdot \left(\operatorname{acos}\left(\frac{\sqrt{u \cdot u + v \cdot v}}{fc}\right) - \sin\left(\operatorname{acos}\left(\frac{\sqrt{u \cdot u + v \cdot v}}{fc}\right)\right)\right) \qquad F_{u,v} := OTF(u - \tau, v - \tau)$$

The Wiener filter transfer function is:

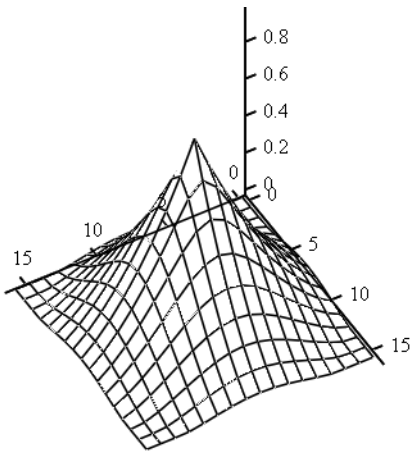
$$H_{u,v} := \frac{F_{u,v} \cdot Ps_{u,v}}{(F_{u,v})^2 \cdot Ps_{u,v} + Pn_{u,v}}$$



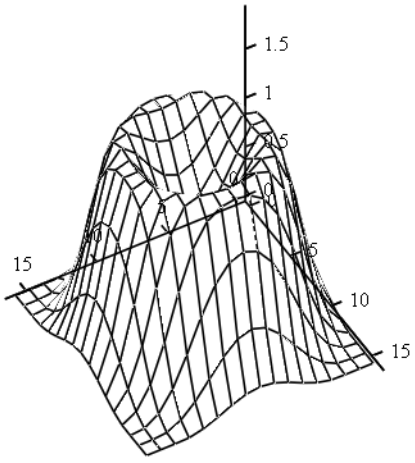
Ps



Pn



F



H

Figure 11-19, 2-D Wiener deconvolution

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