

SMOOTH/AVG : $x(k) = s(k) + w(k)$

s, w nezávislé

$\Theta = s$

$\Rightarrow R_{xx}(k) = R_{ss}(k) + R_{ww}(k) \Rightarrow C_{xx} = P_{xx} = P_{ss} + P_{ww}$

$C_{\Theta x} = C_{sx} = E[sx^T] = P_{ss} \Rightarrow \hat{s} = \underbrace{P_{ss}(P_{ss} + P_{ww})^{-1}}_{\text{Wiener matrix}} x$

pro $k=1$: $\hat{s} = \frac{R_{ss}(1)}{R_{ss}(1) + R_{ww}(1)} x = \frac{\text{SNR}}{\text{SNR} + 1} x$

W je smoothing
Wiener matrix

FILTERING

$\Theta = s[N+1] \Rightarrow C_{\Theta x} = E[s[N+1] [x[1] x[2] \dots x[N+1]]] = [R_{ss}[N+1] R_{ss}[N] \dots R_{ss}[1]]$

$\hat{s}[N+1] = a^T x = C_{\Theta x} (P_{ss} + P_{ww})^{-1} x$

PREDICTION

$\Theta = x[N+k] \Rightarrow C_{\Theta x} = E[x[N+k] [x[1] x[2] \dots x[N]]] = [R_{xx}[N+k] R_{xx}[N+k-1] \dots R_{xx}[k]] := P'_{xx}$

$\hat{x}[N+k] = P'^T_{xx} P'^{-1}_{xx} x = a^T x = \sum_{k=1}^N a_k x[k]$

SLIDE 67: WIENER FILTR