Wiener Filter and Matched Filter Spectral Functions

Section 11.5.7, Figure 11-25 f_11-25.mcd
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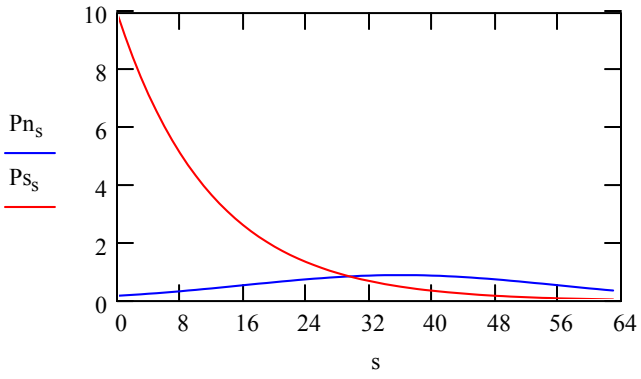
$i := 0 .. 127$ $j := 0 .. 64$ $s := 0 .. 64$ $f_{max} \equiv 64$ $f \equiv 0$ $A \equiv 10$ $B \equiv 0.9$ $\alpha \equiv 1.0$ $a \equiv 12$ $\sigma \equiv 20$ $\tau \equiv 36$

Define signal and noise spectra:

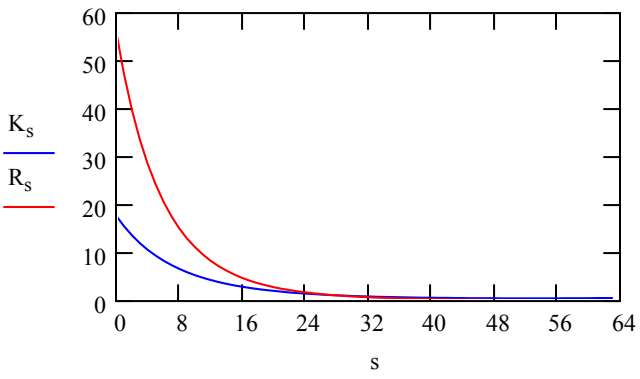
$$Ps_j := A \cdot e^{-\frac{|j|}{a}} \qquad Pn_j := B \cdot \exp\left[\frac{-(j-\tau)^2}{2\cdot\sigma^2}\right] \cdot \cos\left(2\cdot\pi\cdot f\cdot\frac{j-\tau}{128}\right)$$

And the spectral functions of interest:

$$H_j := \frac{Ps_j}{Ps_j + Pn_j} \qquad K_j := \frac{\sqrt{Ps_j}}{Pn_j} \qquad R_j := \frac{Ps_j}{Pn_j} \qquad MSE_j := \frac{Ps_j \cdot Pn_j}{Ps_j + Pn_j}$$



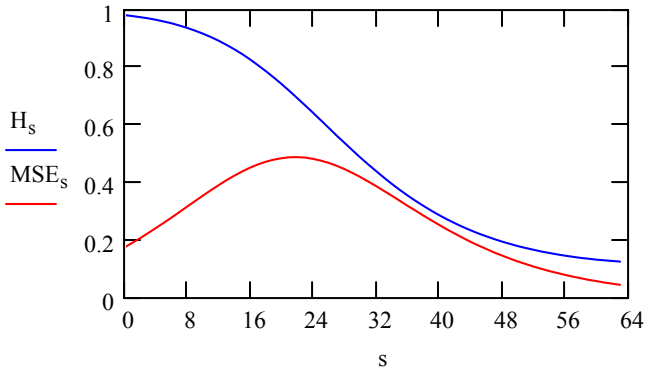
(a)



(b)

$K_0 = 17.755$

$R_0 = 56.145$



(c)

Figure 11-25 Wiener filter and matched filter spectral functions

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