

Cross Power Density Spectrum

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Based on
Probability, Random Variables and Random Signal Principles,
P.Z. Peebles,Jr. and B. Shi

Sum of two random processes

N Gaussian random variables

Definition

$$W(t) = X(t) + Y(t)$$

$$R_{WW}(t, t + \tau) = E[W(t)W(t + \tau)]$$

$$= E[\{X(t) + Y(t)\}\{X(t + \tau) + Y(t + \tau)\}]$$

$$= R_{XX}(t, t + \tau) + R_{YY}(t, t + \tau) + R_{XY}(t, t + \tau) + R_{YX}(t, t + \tau)$$

Sum of two random processes

N Gaussian random variables

Definition

$$W(t) = X(t) + Y(t)$$

$$R_{WW}(t, t + \tau) = E[W(t)W(t + \tau)]$$

$$= R_{XX}(t, t + \tau) + R_{YY}(t, t + \tau) + R_{XY}(t, t + \tau) + R_{YX}(t, t + \tau)$$

$$S_{WW}(\omega) = S_{XX}(\omega) + S_{YY}(\omega)$$

$$+ \mathcal{F} \{A[R_{XY}(t, t + \tau)]\} + \mathcal{F} \{A[R_{YX}(t, t + \tau)]\}$$

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$$W(t) = X(t) + Y(t)$$

$$R_{WW}(t, t + \tau) = E[W(t)W(t + \tau)]$$

$$= E[\{X(t) + Y(t)\}\{X(t + \tau) + Y(t + \tau)\}]$$

$$= R_{XX}(t, t + \tau) + R_{YY}(t, t + \tau) + R_{XY}(t, t + \tau) + R_{YX}(t, t + \tau)$$

