Noise Definition

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

Outline

White Noise

N Gaussian random variables

Definition

$$S_{NN}(\omega) = \frac{N_0}{2}$$

$$R_{NN}(\tau) = \frac{N_0}{2}\delta(\tau)$$

Thermal Noise

N Gaussian random variables

Definition

$$\frac{1}{2\pi}\int_{-\infty}^{\infty} S_{NN}(\omega)d\omega = \infty$$

$$S_{NN}(\omega) = \frac{(N_0/2)(\alpha|\omega|/T)}{e^{\alpha|\omega|/T} - 1}\delta(\tau)$$