Example Random Processes

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

Outline

1. Gaussian Random Processes
2. Poisson Random Process

Gaussian Random Process

N Gaussian random variables

Definition

$$f_X(x_1, \cdots, x_N; t_1, \cdots, t_N) =$$

$$\frac{exp\left\{-(1/2)\left[x-\overline{X}\right]^t [C_X]^{-1} \left[x-\overline{X}\right]\right\}}{\sqrt{(2\pi)^N \left|[C_X]\right|}}$$

Poisson Random Process

N Gaussian random variables

Definition

$$f_X(x) = \sum_{k=0}^{\infty} \frac{(\lambda t)^k e^{-\lambda t}}{k!} \delta(x-k)$$