Multiple Random Variables

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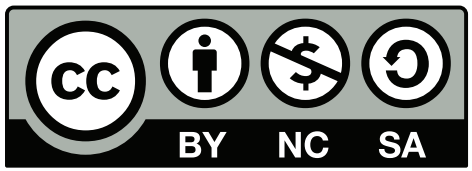

Based on
Probability, Random Variables and Random Signal Principles,
P.Z. Peebles,Jr. and B. Shi

Outline

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A Vector Random Variable

a random vector

Definition

X and Y : two random variables

x and y : specific values of X and Y

(x, y) : the ordered pair of numbers

a random point vector in the xy plane

Range Sample Space

two dimensional product space, a joint sample space S_J

Definition

an event $A = \{X \leq x\}$ referes to
the sample space S : $\{X(s) \leq x\}$

an event $B = \{Y \leq y\}$ refers to
the sample space S : $\{Y(s) \leq y\}$

a joint event $A \cap B = \{X \leq x,\ Y \leq y\}$ refers to
the sample space S_J : $\{X(s) \leq x,\ Y(s) \leq y\}$

General Range Sample Space

multi-dimensional product space, a joint sample space S_J

Definition

$X_1, X_2, \cdots, X_N$: N random variables
defined on a sample space S

$(x_1, x_2, \cdots, x_N)$:an N-dimensional random vector (random variable)
defined on an N-dimensional joint sample space