Characteristics of Multiple Random Variables

Young W Lim

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

Outline

Bivariate Gaussian Density

one function

Definition

The probability distribution and probability density functions of
Y=g(X_1, ..., X_N)
The probability distribution

$$F_Y(y) = P\{Y \leq y\} = P\{g(X_1, ..., X_N) \leq y\}$$

this probability is associated with all points in the $(x_1, x_2, ..., x_N)$ hyperspace that map such that $g(X_1, ..., X_N) \leq y$ for any y
integrate all such points according to

$$F_Y(y) = P\{g(X_1, ..., X_N) \leq y\}$$

$$= \int \cdots \int_{g(X_1,...,X_N) \leq y} f_{x_1,\cdots,x_N}(x_1, \cdots, x_N) dx_1 \cdots dx_N$$