

# Characteristics of Multiple Random Variables

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

# Outline

## 1 Simulation of Multiple Random Variables

# Estimate of mean

## $N$ Gaussian random variables

### Definition

$$\hat{\bar{x}}_N = \frac{1}{N} \sum_{n=1}^N x_n$$

$$\hat{\bar{X}}_N = \frac{1}{N} \sum_{n=1}^N X_n$$

# Mean of the estimate of mean

$N$  Gaussian random variables

## Definition

$$E\left[\hat{X}_N\right] = E\left[\frac{1}{N} \sum_{n=1}^N X_n\right] = \frac{1}{N} \sum_{n=1}^N E[X_n] = \bar{X}$$



