

# Detection and Estimation Theory

## Random Processes

- Introduction and Definitions
- Expectations
- Properties of Correlation Functions
- Autocorrelation Function
- Cross-Correlation Function
- Wide-Sense Stationary
- Ergodicity

## Statistical Decision Theory

- Introduction
- Bayes' Criterion
- Binary Hypothesis Testing
- $M$ -ary Hypothesis Testing
- Minimax Criterion
- Neyman-Pearson Criterion
- Composite Hypothesis Testing
- Sequential Detection

## Parameter Estimation

- Introduction
- Maximum Likelihood Estimation
- Generalized Likelihood Ratio Test
- Some Criteria for Good Estimators
- Bayes' Estimation
- Minimum Mean-Square Error Estimate
- Minimum Mean Absolute Value of Error Estimate
- Maximum A Posteriori Estimate
- Cramer-Rao Inequality
- Multiple Parameter Estimation
- Best Linear Unbiased Estimator
- Least-Square Estimation
- Recursive Least-Square Estimator