IMPTE

International Master's Program in Telecommunication Engineering

Course Name: Statistical Communication Theory
統計通信理論

Course Objects:

The course is intended as an introduction to detection and estimation theory for students in electrical and communications engineering. It aims to develop fundamental concepts and methods of this field and illustrate their applications through some examples.

Course Syllabus:

Part 1: Review of the requisite mathematical concepts
1) Linear and matrix algebra
2) Probabilities
3) Random processes
Part 2: Detection theory
1) Hypothesis testing
2) Neyman-Pearson theorem
3) Receiver Operating Characteristics (ROC)
4) Detection of deterministic signals & matched Filter
5) Composite hypothesis testing
6) Detection of deterministic signals with unknown parameters
Part 3: Estimation theory
1) Minimum variance unbiased estimation
2) Cramer-Rao Lower Bound (MRLB)
3) Sufficient statistics
4) Maximum likelihood estimation
5) Least-Square estimation
6) Bayesian estimation: MMSE and MAP estimations