EE 631   DETECTION AND ESTIMATION THEORY   Fall 2002

Lecturer: M. Soumekh
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Office Hours: M, W 3:00-3:50
Text: H. Van Trees, Detection, Estimation, and Modulation Theory, Part I

References:

1.   Wozencraft and Jacobs, Principles of Communication Engineering
2.   Proakis, Digital Communications
3.   Sage and Melsa, Estimation Theory with Application to Communications and Control
4.   Ferguson, Mathematical Statistics
5.   C. Rao, Elements of Statistical Inference

Grading Policy:

     Exam #1   50%
     Exam #2   50%

Tentative Schedule:

1.   Introduction to detection and estimation. Classical decision theory, M-ary, and binary hypothesis. (Chapter One, 2.1, 2.2.1, 2.3)

2.   Receiver operating characteristic, Bayes estimation, real parameter estimation. (2.2.2, 2.4.1, 2.4.2)

3.   Multiple parameter estimation, composite hypotheses. (2.4.3, 2.5)

4.   The general Gaussian problem, performance bounds. (2.6, 2.7)

5.   Performance bounds. (2.7, 2.8)

6.   Orthogonal representations, Karkunen-Loeve expansion and integral equations. (3.1-3.4.4)

7.   Optimum linear time-varying filters, eigenvalues and eigenfunctions, spectral decomposition, communications system models. (3.4.5-3.7, 4.1)

8.   Detection in AWGN, linear estimation (4.2)

9.   Detection in NWGN, performance and solution techniques. (4.3)

10.   Signals with unwanted parameters. (4.4)