TEL 502E – Detection and Estimation Theory

Spring 2014

Instructors : İlker Bayram
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Class Meets : Tuesday, 9.30 – 12.30, EEB 5307

Textbook : Fundamentals of Statistical Signal Processing (Vols. I,II), S. M. Kay, Prentice Hall.

Supplementary : An Introduction to Signal Detection and Estimation, H. V. Poor, Springer.

Webpage : There's a 'ninova' page, please log in and check.

Grading : Homeworks (10%), Midterm exam (40%), Final Exam (50%).

Attendance : You need to attend at least 70% of the lectures to sit for the final exam.

Tentative Course Outline

(1) Review of probability theory

(2) Simple Hypothesis Testing, the Neyman Pearson Lemma

(3) Bayesian Tests, Multiple Hypothesis Testing

(4) The detection problem under different scenarios

(5) The estimation problem, minimum variance unbiased estimators

(6) The Cramér-Rao bound, sufficient statistics, Rao-Blackwell Theorem

(7) Linear Estimators, maximum likelihood estimation

(8) Bayesian estimation, minimum mean square estimators, maximum a posteriori estimators

(9) The innovations process, Wiener filtering, recursive least squares, the Kalman filter