EECS 564
Estimation, Filtering, and Detection

Fall 2004

LECTURES: TTh 11:30 - 1:00, 1017 Dow.
INSTRUCTOR: Alfred Hero, 4229 EECS, (76)3-0564
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OFFICE HOURS: Tue. 1:00-2:00, Thurs. 4:00-5:30, and by appointment.

PREREQUISITES: EECS 501 or equivalent

COURSEPACK: "Statistical Methods for Signal Processing", A. O. Hero, 2004. Available at Dollar Bill (611 Church St. (665-9200).

EECS564 HOMEPAGE: `http://www.eecs.umich.edu/~hero/EE564/ee564.html`

Catalog Description

Principles of estimation, linear filtering and detection. Estimation: linear and nonlinear minimum mean squared error estimation, and other strategies. Linear filtering: Wiener and Kalman filtering. Detection: simple, composite, binary and multiple hypotheses. Neyman-Pearson and Bayesian approaches.

Course Requirements

Your course grade will be computed from the results of a midterm exam (40%), a final exam (50%), and biweekly homework assignments (10%). All exams will be open book and open notes. If you have any conflicts with the dates below you must so inform me before Sept. 27, 2004.

Midterms: The midterm exam will be administered in the evening of Mon. Nov 8 from 6:00-8:00 PM in XXXX EECS.

Final: The final exam will be held at the regularly scheduled time Dec 16, 2004, 1:30-3:30PM in 1017 Dow.

Homework: Assignments and solutions will be posted on the EECS564 homepage. Students may consult with one another on homework assignments but must turn in their own work (see policies on collaboration on course web page). Some numerical assignments may require use of the computer, e.g. using Matlab or Mathematica. No late homework will be accepted.

EECS564 RESERVE LIST (Fall 2004)

[SRV] *Introduction to Statistical Signal Processing with Applications* Srinath, Rajesekaran, and Viswanathan, Prentice Hall, 1996

[W] *Detection of Signals in Noise*, Whalen, Academic Press, 1995

[H] *Elements of Signal Detection and Estimation*, Prentice Hall, Englewood Cliffs, NJ, 1995

[VT] *Detection, Estimation, and Modulation Theory, Vol. I*, VanTrees, Wiley, 1971

[L-TSH] *Testing Statistical Hypotheses*, Lehmann, Wiley, 1958.

[L-TPE] *Theory of Point Estimation*, Lehmann, Wiley, 1991 a

[F] *Mathematical Statistics – A Decision Theoretic Approach*, Ferguson, Academic Press, 1967.

[AM] *Optimal Filtering*, Anderson and Moore, 1979.

[K] *Lectures on Wiener and Kalman Filtering*, Kailath, 1981.

[BP] *Random data*, Bendat and Piersol, 1986.

[MGB] *Introduction to the Theory of Statistics*, Mood, Graybill, and Boes, 1974.