

ORF 524

Fall Semester, 2008 TTh 3:00 – 4:20 in E-225

Home page: <http://www.orfe.princeton.edu/~jqfan>

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Office Hours: Tuesday 11:00-12:00, Thursday 4:30–5:30, or by appointments.

Assistance in Instruction: Yang Feng, Office: 220 ORFE, 258-4660, yangfeng@princeton.edu.

Office Hours: Monday 4:30-5:30, Wednesday 11:00–12:00.

Textbook: Bickel, Peter J. and Doksum, Kjell A. (2001), *Mathematical statistics : basic ideas and selected topics*, 2nd ed. Upper Saddle River, NJ: Prentice Hall.

Reference:

- Rice, J.A. (1995). *Mathematical Statistics and Data Analysis*. (2nd ed.), Duxbury Press.
- Casella, George and Berger, Roger L. (2002), *Statistical inference*, 2nd ed., Pacific Grove, CA: Duxbury
- Lehmann, Erich L. and Casella, George (1998), *Theory of Point Estimation*, 2nd ed., New York: Springer
- Lehmann, Erich L. (1997). *Testing statistical hypotheses*, 2nd ed., New York, Springer

Syllabus: Course material will be covered the following chapters (in order):

- Chapter 1: Statistical Models (1. Models, parameters, and statistics; 2. Bayesian models; 3. Sufficiency; 4. Exponential families)
- Chapter 2: Methods of Estimation (1. Heuristic method; 2. Estimation equation; 3. Maximum likelihood; 4. E-M Algorithm)
- Chapter 3: Measure of Performance (1. Decision theoretic framework 2. Bayesian procedures; 3. Minimax procedures; 4. Unbiased estimation and risk inequalities)
- Chapter 4. Testing and confidence regions (1. Introduction 2. Neyman-pearson’s lemma; 3. UMP tests; 4. Confidence intervals; 5. Duality between confidence regions and tests; 6. Prediction intervals; 7. Likelihood ratio procedures)
- Chapter 5 (combined with Chap 6 of the book) Asymptotic Approximations (1. Meaning and uses of asymptotics; 2. Consistency; 3. Delta method; 4. Asymptotic estimation theory. 5. Large sample tests and confidence regions. 6. Asymptotics of posterior distribution)
- Chapter 6. Linear Models and Generalized Linear Models (1. Least-squares and related quantities; 2. Inference about linear models; 3. Prediction; 4. Introduction to GLIM)

Homework: Problems will be assigned at class meetings and will be due in class on Tuesdays of following weeks. No late homework will be accepted. Missed homework will receive a grade of zero. The lowest score will be dropped. The homework will be graded, and each assignment carries equal weight. You are allowed to work with other students on the homework problems, however, verbatim copying of homework is absolutely *forbidden*. Therefore each student must ultimately produce his or her own homework to be handed in and graded.

Exams: There will be one in-class midterm exam, and a final exam. All exams are required and there will be no make-up exams. Missed exams will receive a grade of zero. All exams are open-book and open-notes. Calculators may be used during the exams.

Schedules and Grading Policy:

Homework (25%) due in class every Tuesday
Midterm Exam for *this class* (25%) Tuesday, November 11, 2008 (tentative).
FINAL EXAM for *this class* (50%) January 14, 2009 (tentative).