Syllabus for SS-223A: Advanced Topics in Econometric Theory:

Asymptotics of Optimization Estimators

Fall, 2013

Room: 19 Baxter
Days and Times: Tuesdays and Thursdays, 10:30am - 11:55am

Instructor: Bob Sherman
Office: 119 Baxter
Phone: 4337
Office Hours: By appointment

Secretary: Sabrina Boschetti
Office: 123 Baxter
Phone: 4228

Course Description: Almost all estimators (econometric or otherwise) of population parameters are optimization estimators, that is, they are obtained by optimizing sensible random criterion functions. Notable examples include least squares estimators and maximum likelihood estimators, but include many other interesting estimators as well. This course develops methods for determining the asymptotic distributions of such estimators. Such results are required to do asymptotic inference about the population parameters. This class will (i) develop a general framework that will cover standard as well as nonstandard estimators (including optimizers of convex or concave criterion functions) and (ii) provide a brief introduction to empirical process methods, time permitting.

Grading: Grades will be determined by performance on 4 homework sets. No exams.

Final letter grades will be determined as follows:

A: 90% or higher
B: 80-89%
C: 70-79%
D: 60-69%
F: Below 60%

Collaboration Policy: You are encouraged to freely collaborate on the homework sets. That is, you may discuss and even work out solutions to the homework sets together. However, you

must write up your own solutions. No copying.

Some reference texts:

1. *Serfling (1980), Approximation Theorems of Mathematical Statistics, Wiley
2. *White (2001), Asymptotic Theory for Econometricians, Academic Press
3. *Pollard (1984), Convergence of Stochastic Processes, Springer-Verlag
4. Amemiya (1985), Advanced Econometrics, Harvard University Press
5. Lehmann (2004) Elements of Large Sample Theory, Springer
6. Davidson (2000), Econometric Theory, Blackwell
7. Potscher and Prucha (1997) Dynamic Nonlinear Econometric Models: Asymptotic Theory, Springer
8. Andrews (1994), Empirical Process Methods in Econometrics, in Handbook of Econometrics, Volume IV, Engle and McFadden, editors
9. Billingsley (1968,2003), Convergence of Probability Measures, Wiley
10. Chung (1974), A Course in Probability Theory, Academic Press
11. Dudley (1989), Real Analysis and Probability, Wadsworth and Brooks/Cole
12. Lehmann (1983), Theory of Point Estimation, Wiley
13. Rudin (1974), Real and Complex Analysis, McGraw Hill
14. Weak Convergence of Empirical Processes (1996), van der Vaart and Wellner, Springer.

* means on reserve at Sherman-Fairchild Library (inquire at the circulation desk)

Some papers that I may hand out to you eventually or have on reserve at Millikan:

1. Pollard (1989) Asymptotics via Empirical Processes. Statistical Science 4, 341-366.
2. Chernoff (1954), On the distribution of the likelihood ratio. Ann. Math. Statist. 25, 573-578.
3. Chernoff (1956), Large sample theory: parametric case. Ann. Math. Statist. 27, 1-22.
4. Huber (1967), The behavior of maximum likelihood estimates under nonstandard conditions. In Fifth Berkeley Symposium on Mathematical Statistics and Probability, Berkeley, CA: University of California.
5. Pollard (1985), New ways to prove central limit theorems. Econometric Theory, 295-314.
6. Wald (1949), Note on the consistency of the maximum likelihood estimate. Ann. Math. Statist. 20, 595-601.

Here's a tentative schedule for the term:

Week 1 1st HW assigned
Week 3 1st HW due, 2nd HW assigned
Week 5 2nd HW due, 3rd HW assigned
Week 7 3rd HW due, 4th HW assigned
Week 9 4th HW due
12/05 last day of class