

UNIVERSITY OF COLORADO - DEPARTMENT OF ECONOMICS
ECON 8828 - SEMINAR IN ECONOMETRICS - FALL 2013
PROFESSOR CARLOS MARTINS-FILHO

Office. Economics Building 105

Meetings. Tuesdays and Thursdays from 12:30 PM - 1:45 PM in ECON 5.

Office hours. Tuesdays 2:00 PM - 3:30 PM and by appointment. For appointment send an email to carlos.martins@colorado.edu.

Class URL. http://spot.colorado.edu/~martinsc/ECON_8828.html

Prerequisites. ECON 7828 (or equivalent) or consent of instructor.

Objectives. This course is designed to be an advanced introduction to several semi/nonparametric models for density, regression and associated estimation and inference procedures. Hence, our broad objectives are:

1. Have advanced knowledge of fundamental estimation and inference methods used for nonparametric statistical models. This will include a careful treatment of their asymptotic behavior.
2. Be able to program and implement the various estimators and test procedures discussed in class.

Grades. Your course grade depends on six homework sets a final examination. Relevant dates are given below.

Evaluation	Points	Date
Homework sets	60	TBA in class
Final examination	40	December 18, 7:30 PM - 10:00 PM

Textbooks.

1. Li, Q. and J. S. Racine, 2007, Nonparametric Econometrics: Theory and Practice, Princeton University Press, Princeton.
2. Pagan, A. and A. Ullah, 1999, Nonparametric Econometrics, Cambridge University Press, Cambridge.
3. Tsybakov, A., 2009, Introduction to Nonparametric Estimation, Springer, New York.
4. I will distribute class notes. Read them carefully. They reflect my view of what are the most important concepts/theorems we cover in the course.

Support and Reference Books.

A. Mathematics, Probability, Statistics and Asymptotic Theory

1. Apostol, T., 1974, Mathematical Analysis, Addison Wesley, New York.
2. Bartle, R., 1966, Elements of Integration, John Wiley and Sons, New York.
3. Davidson, J., 1994, Stochastic Limit Theory, Oxford University Press, Oxford.

4. Grimmett, G.R. and D.R. Stirzaker, 1992, Probability and Random Processes, Oxford University Press, Oxford.
5. Jacod, J. and P. Protter, 2000, Probability Essentials, Springer, Berlin.
6. Luenberger, D., 1969, Optimization by vector space methods. John Wiley and Sons, New York.
7. Massopust, P., 2010, Interpolation and Approximation with Splines and Fractals, Oxford University Press, Oxford.
8. Royden, H., 1988, Real Analysis, Macmillan, New York.
9. van der Vaart, A., 1998, Asymptotic Statistics, Cambridge University Press, Cambridge.

B. Nonparametric Models

1. de Boor, C., 2001, A Practical Guide to Splines, Springer, Berlin.
2. Eubank, R., 1999, Nonparametric Regression and Spline Smoothing, Second Edition, Marcel-Dekker, New York.
3. Fan, J. and I. Gijbels, 1996, Local Polynomial Modeling and its Applications, Chapman and Hall, London.
4. Prakasa-Rao, B.L.S., 1983, Nonparametric Functional Estimation, Academic Press, New York.

Topics.

1. Density and Distribution Estimation

- 1.1 An overview
- 1.2 Density estimation: the Rosenblatt kernel density estimator and some of its finite and asymptotic properties under random sampling
- 1.3 Distribution estimation based on the Rosenblatt kernel density estimator and its asymptotic properties.
- 1.3 Bandwidth choice: an introduction to cross-validation and plug-in methods
- 1.4 Some variations on the basic estimator

2. Nonparametric Regression Estimation

- 2.1 The Nadaraya-Watson estimator
- 2.2 The Local Polynomial estimators
- 2.3 Some finite sample and asymptotic properties under random sampling
- 2.4 Bandwidth choice
- 2.5 Implementation and Monte Carlo simulations.

3. Additive Models of Regression

- 3.1 An introduction and discussion of identification
- 3.2 Backfitting and marginal integration estimation
- 3.3 An introduction to splines

- 3.4 The spline backfitted kernel estimator
- 3.5 Asymptotic properties and oracle efficiency
- 4. Conditional variance estimation
 - 4.1 Residual based local linear estimation
- 5. Semiparametric Models
 - 5.1 Partially linear models of regression
 - 5.2 Single index models of regression
 - 5.3 Semiparametric models for regression
 - 5.4 Nonparametric regression estimation with parametric covariance
- 6. Nonparametric regression with endogenous regressors

Important information.

- If you qualify for accommodations because of a disability, please submit a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail dsinfo@colorado.edu.
If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with me.
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See full details at www.colorado.edu/policies/fac_relig.html.
- Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at www.colorado.edu/policies/classbehavior.html. and at www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code.
- All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not

limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at www.colorado.edu/policies/honor.html and at www.colorado.edu/academics/honorcode/.

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