ECON 900
Nonparametric Estimation

P.W. Wilson Spring 2019

Class location and time: ASC 315, Tuesday and Thursday, 2:00–3:15pm
Office: 200D Sirrine Hall
Office hours: 3:30pm–4:30pm Tuesday and Thursday, or by appointment
Email: pww@clemson.edu
WWW: http://pww.people.clemson.edu

Required texts:


Other texts that might be useful:


Additional Course Materials:

You can (eventually) find additional course materials, including a reading list, by going to my home page (see above), clicking on the link entitled “Course Materials for Students,” and following the obvious links.

Course Objectives:

This is an advanced topics course on non-parametric estimation methods. Although the course is intended for Ph.D. students in economics, others may find the material useful and
are welcome. Students are expected to have successfully completed the department’s graduate course on introductory mathematical statistics (ECON 806) or an equivalent course. Completion of and Econometrics II (ECON 807) and Econometrics III (ECON 808) might be helpful, but is not essential. This course will provide students with tools needed to evaluate applied work by others, as well as to conduct empirical research using non-parametric methods.

Course Content:

This course considers alternatives to the fully parametric models and estimation methods introduced in ECON 807 and ECON 808. Non-parametric methods require fewer, or at least weaker, assumptions than required by fully parametric, maximum likelihood methods, and thus avoid some of the risk of specification error associated with the latter methods. However, there is (as usual) a trade-off: for a given sample size, non-parametric methods typically incur greater estimation error than a correctly-specified parametric method. However, given (i) the increasing availability of large data sets and (ii) the likelihood that most if not all fully parametric models are mis-specified, moving from fully parametric methods toward non-parametric methods is often advantageous. The emphasis in the course will be on practical application, although some discussion of theory is required to avoid pitfalls.

The following provides a tentative course outline; coverage may vary depending on time and interest.

I. Introduction

II. Univariate Data Representation

III. Histogram Density Estimators
   A. Properties
   B. Equivalent Sample Sizes
   C. Data-Based Bin-Width Selection
   D. Multivariate Setting

IV. Kernel Density Estimators
   A. Properties
   B. Optimal Kernels
   C. Higher-Order Kernels
   D. How Hard is a Particular Density to Estimate?
   E. Density Derivative Estimation
   F. Bandwidth Selection
   G. Boundary Effects
   H. Multivariate Setting

V. Kernel Regression
   A. Bandwidth Selection
   B. Confidence Intervals
C. Regression Derivatives
D. Quantile Estimation
E. Discrete Regressors
F. Multivariate Setting
G. Derivative Estimation

VI. Local Polynomial Regression
   A. Design Adaptation
   B. Boundary Effects
   C. Bandwidth Selection
   D. Multivariate Setting
   E. Derivative Estimation

VII. Series Estimators

VIII. Inference
   A. Bootstrap Methods
   B. Parametric versus Nonparametric Fits
   C. Tests of Stochastic Dominance

IX. Estimating Productive Efficiency
   A. Frontier Estimators
   B. Partial Frontier Estimators
   C. Testing Issues

X. Survival Analysis

Course Grade Determination:

Students’ grades will be determined by homework assignments and a research paper. The research paper will account for 90–95 percent of the grade. I expect the homework assignments to be done individually; however, I encourage you to consult with each other in working the homework assignments. Copying someone else’s work is not permitted—you may discuss how to approach a given problem with others, but each student should do his own work. Some of the homework assignments will include empirical exercises, and will serve to reinforce material discussed in class.
Clemson University requires that course syllabi contain the following statements:

- “Students with disabilities requesting accommodations should make an appointment with Dr. Arlene Stewart (656-6848), Director of Disability Services, to discuss specific needs within the first month of classes. Students should present a Faculty Accommodation Letter from Student Disability Services when they meet with instructors. Accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester.”

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