

ECONOMETRICS 220A

Course Description:

The course is designed to be an introduction to probability and statistical theory to prepare students for the remainder of the econometrics sequence. The emphasis of the course is to understand the basic principles of statistical theory.

Books

The text, which will be followed closely, is

Casella, G. and R. Berger, Statistical Inference, 2nd Edition, Duxbury.

This book covers all of the material of the course and in addition provides many problems for practice as well as excellent references.

Other books that you may find useful are

Ramanathan, R. Statistical Methods in Econometrics, Academic Press (1993).

Similar in level to the text, but uses skills from 220A and has a more extensive coverage of multivariate distributions.

Gallant, A.R. An Introduction to Econometric Theory, Princeton University Press (1997).

More rigorous especially in regards to asymptotic theory and related areas.

In addition undergraduate texts are useful in seeing applications in more detail than the class.

Course Outline

The course outline gives an estimate of the number of classes to cover the topic. In addition, general reading guides are suggested from the above books (CB = Casella and Berger etc.).

Probability

1. Basic theory, conditional probability and Bayes Rule. (1.5), CB ch1, R ch2, G ch1.
2. Random Variables, distributions, expectations (1.5), CB ch2.1-2.3, R ch3, G ch2.
3. Common distributions (1), CB ch3
4. Joint, marginal and conditional distributions, stochastic independence, multivariate dists (3)
CB ch4, R ch5, G ch3.

Random Samples and Asymptotic Methods

1. Sampling and sums of random variables (1), CB 5.1-3, R ch6-7.
2. Laws of large numbers and central limit theorem (2), CB 5.5, R ch7, G ch4.

Statistical Theory

1. Point Estimation (2), CB ch7.2, 6.2.1, R ch8, G. ch5.
2. Evaluation of estimators: unbiasedness, sufficiency, consistency, Cramer-Rao theorem (3)
CB ch 7.3, 6.1.1, 6.1.2, R ch 8.
3. Hypothesis tests, Neyman Pearson lemma, Likelihood Ratio and related tests (3)
CB ch 8, R ch9, G. ch5.
4. Interval estimation (1), CB ch 9, R ch9.3.

Grading

There will be a midterm (25 October in class) and a final exam during exam week (worth 40% and 60% respectively). Problem sets and solutions will also be handed out but not graded. In addition I have the answer key to the problems in the book which is on reserve in the economics library. It is important to do problems in this course, and to try and solve those problems without having seen the answers.