ECON 508 (Summer 2006)
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Syllabus

1 Overview

ECON 508 is a review course of basic mathematics and optimization techniques. The goal of this mini course is to provide you with a survival tool-kit for your graduate work (especially for the first year of course work). Depending on your background, you may find yourself comfortable with most or all of the material covered here. Nonetheless, I encourage you to put serious effort in ECON 508 not only because your grade on the test will be incorporated into your final grade in ECON 511 but also because you will come to appreciate what's been covered in ECON 508 pretty soon. Deeper and more rigorous math (analysis and some topology) will be taught in ECON 511.

2 Requirements

Class meets every weekday for two hours (9:00am to 11:00am) from August 3rd to August 23rd (with the exception of August 22nd). If needed, we may also meet on August 24th.

There will be a closed-book test on August 25th (Friday). As mentioned, your final grade on the test will be incorporated into your final grade in ECON 511.

There will be roughly two homework sets every week. You are required to submit the homework on the due-date in class. Please come to talk to me if you find the homework too hard or too much. As usually the case in graduate school, you are *encouraged* to work together. But you should try to solve the problems yourself first and you are expected to *write up the answers by yourself.*

3 Outline

We will cover (1) univariate calculus (very brief); (2) linear algebra; (3) multivariate calculus; (4) concavity; and (5) optimization. The goal is to build a solid foundation in better understanding and tackling of optimization problems. To that end, the first four topics will be given enough treatment but the last topic is what I hope we could spend more time on.

4 Texts

To get a good sense of what math tools will be useful for the first year core sequence, refer to the concise and comprehensive math appendix of Mas-Colell, Whiston, and Green (1995).

For our mini course, the required textbook is Angel de la Fuente (2000). Recommended textbooks are Chiang and Wainwright (2005) and Sundaram (1996).

You will find that de la Fuente is probably the best (and most advanced) book out there that serves our purpose. Though we'll not be able to cover everything in the book and I will not follow it very closely, the book is very well structured and is of good depth. You will probably consult it quite often long after you are done with ECON 508.

The new edition of the classic book by Chiang, Chiang and Wainwright (2005), is recommended. Depending on your taste and your math background, you may find it very helpful. The previous edition of the book actually got me started. Chiang's books are usually reader-friendly since he takes great pains to motivate the readers and to explain things. On the downside, you may find the book wordy sometimes and the depth not enough. Notice the above comments are based on the previous edition of the book.

Sundaram (1996) gives an advanced treatment of optimization theory. You may find this book helpful.

You probably have heard of Simon and Blume (1994). I'd rather use it as a reference than as a textbook.

References

[1] CHIANG, A. C., AND K. WAINWRIGHT (2005): *Fundamental Methods of Mathematical Economics (4th ed.).* McGraw-Hill, New York, NY.

[2] DE LA FUENTE, A. (2000): *Mathematical Methods and Models for Economists.* Cambridge University Press, New York, NY.

[3] MAS-COLELL, A., M. WHISTON, AND J. GREEN (1995): *Microeconomic Theory.* Oxford University Press, New York, NY.

[4] SIMON, C. P., AND L. BLUME (1994): *Mathematics for Economists.* W. W. Norton, New York, NY.

[5] SUNDARAM, R. K. (1996): *A First Course in Optimization Theory.* Cambridge University Press, New York, NY.