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Assignment #10 for **Mathematics for Economists**

Economics 362M, Spring 2010

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Due date: Tue. April 27.

Readings: CSZ, Ch. 4.8, 4.9 and 5.1.

Continuity (and uniform continuity) will finish off our coverage of topics from Chapter 4. The important results here are: a subset of $\mathbb{R}^\ell$ is compact if and only if every continuous function on it achieves its maximum; and every continuous function on a compact set is uniformly continuous.

The first section of Chapter 5 covers a basic geometric concept, convexity. Convexity will be the crucial for our study of constrained optimization.

Economists' basic model of behavior is that people maximize their preferences over their sets of options. When the preferences can be represented by a continuous utility function and the set of options is compact, by our work in Chapter 4, we have a non-empty theory of behavior. Our work in Chapter 5 will be about special classes of cases of utility functions, the concave and quasi-concave ones, and special cases of sets of options, the compact and convex ones. The basic result that we are aiming at is the Karesh-Kuhn-Tucker Theorem, which tells us about the uses of Lagrange multipliers.

Homework 10.1. From Chapter 4.8: *4.8.9.*

Homework 10.2. From Chapter 4.8: *Pick any two of the six problems given in 4.8.10.*

Homework 10.3. From Chapter 4.8: *Pick any two of the four problems given in 4.8.13.*

Homework 10.4. From Chapter 4.8: *4.8.17.*

Homework 10.5. From Chapter 4.9: *4.9.2.*

Homework 10.6. From Chapter 5.1: *5.1.15.*

Homework 10.7. From Chapter 5.1: *5.1.18 and 5.1.19.*