BOSTON COLLEGE
Department of Economics

Nonlinear Programming and
EC 720   Dynamic Optimization   M. Kraus

Text: Kamien, M.I. and Schwartz, N.L. (1991). *Dynamic Optimization*, 2nd edition.

  I. Nonlinear Programming

     A. Kuhn-Tucker Theory

 II. Calculus of Variations

     A. Simplest Problem

        Kamien and Schwartz, Part I, Sections 1 and 3.

     B. Free End Values

        Kamien and Schwartz, Part I, Section 8.

III. Optimal Control Theory

     A. Basic Problem

        Kamien and Schwartz, Part II, Sections 1, 2 and 5.

     B. Specified Terminal States

        Kamien and Schwartz, Part II, Section 6.

     C. Free Terminal Time

        Kamien and Schwartz, Part I, Section 9.

        Mills, E.S. and de Ferranti, D.M. (1971). "Market Choices and Optimum City Size,"
        American Economic Review Proceedings, 61, 340-345.

     D. Salvage Value (Terminal Costs)

        Kamien and Schwartz, Part I, Section 11.

     E. Bounded Controls: The Maximum Principle

        Kamien and Schwartz, Part II, Section 10.

     F. Discounting and Current Value Hamiltonians

        Kamien and Schwartz, Part II, Section 8.

G. Infinite Horizon Control Problems

Halkin, H. (1974). "Necessary Conditions for Optimal Control Problems with Infinite Horizons," *Econometrica,* 42, 267-272.

Michel, P. (1982). "On the Transversality Condition in Infinite Horizon Optimal Problems," *Econometrica,* 50, 975-985.

IV. Dynamic Programming

A. Bellman's Principle of Optimality

B. Optimization in Discrete Time

1. Bellman's Recurrence Equation

Dixit, A.K. (1990). *Optimization in Economic Theory*, 2nd edition, Chapter 11, *The Bellman Equation*.

2. Stochastic Dynamic Programming

Dixit, Chapter 11, *Uncertainty*.

C. Optimization in Continuous Time

1. An Economic Interpretation of Optimal Control Theory

Dorfman, R. (1969). "An Economic Interpretation of Optimal Control Theory," *American Economic Review*, 59, 817-831.

2. The Hamilton-Bellman-Jacobi Equation

Kamien and Schwartz, Part II, Section 21.

Dixit, Chapter 11, *Continuous Time*.