MA104 Lesson 52

LESSON 52 - Optimization

Thursday, 25 April, 2008

Outline

1. Admin
2. Last Class
3. Optimization
   - Course Guide
   - Steps for Optimization
   - Examples
   - Do Problem Help
4. Look Forward - SOLVING MULTIVARIATE OPTIMIZATION PROBLEMS II

Admin

1. Mini-WPR on Friday. Block IV material through lesson 52 Multivariate Optimization.
2. Project - Problem 2.
    1. Look at Lagrange Multipliers!
3. Block IV Study Guide

Lesson 51 - Extrema of Functions of Two Variables II

Questions?

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Objectives

1. Model and solve multivariate optimization problems.
    1. Given a problem, be able to determine a multi-variable objective function.
    2. Given limitations in a problem, write a constraint equation.
    3. Transform a multivariable objective function into a two variable objective function when only one constraint exists.
    4. Interpret the results of a mathematical solution as it applies to a problem.

READ

1. Stewart: Section 14.7, pages 922-930.
2. Student Notes.

THINK ABOUT

1. Why do we sometimes use the Second Derivatives Test and other times we invoke the Extreme Value Theorem for functions of two variables?

DO Problems

1. Section 14.7/ 39, 43, 46

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Steps for Optimization

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5. Use the Second Derivative Test to determine the classification of the critical points. Again Mathematica can make finding the Determinant easier. In our case we get $D > 0$ and $f_{xx} < 0$ proving we have a maximum.

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6. Test the Critical Points in the function to determine the Max or Min you are seeking. In our case we get $f(2, 2) = 4$

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Examples

1. The Box

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DO Problems

1. Section 14.7/ 3, 5, 7, 9, 11
2. Section 14.7/ 30, 32, 33
3. Section 14.7/ 39, 43, 46

LESSON 53 - SOLVING MULTIVARIATE OPTIMIZATION PROBLEMS II

1. OBJECTIVES:
   1. Model and solve multivariate optimization problems.
2. READ:
   1. Stewart: Section 14.7, pages 922-930.
3. THINK ABOUT:
   1. Why do we sometimes use the Second Derivatives Test and other times we invoke the Extreme Value Theorem for functions of two variables?
4. DO:
   1. Section 14.7/ 48, 50, 51

Questions?

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