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ECON3120/4120 Mathematics 2, autumn 2008

Problems for Seminar 11, 17–21 November

1 Consider the problem

$$\max f(x,y) = cx + y \quad \text{s.t. } g(x,y) = x^2 + 3y^2 \leq 2, \quad x \geq 0, \quad y \geq 0$$

(a) Write down the necessary Kuhn–Tucker conditions.

(b) Solve the problem for all values of the constant c.

(c) Let $V(c)$ denote the maximum value of $f(x,y)$ as a function of c. Find $V(c)$ for all values of c, and show that it is continuous everywhere.

2 (a) Solve the problem

$$\text{minimize } (x-2)^2 + (y-2)^2 \quad \text{s.t. } \begin{cases} x + y \leq 2, \\ x^2 - 4x + y \leq -2. \end{cases}$$

(b) Can you give a geometric interpretation of the problem and thereby confirm the answer in part (a)?

3 Exam problem 22

4 Exam problem 98

5 Exam problem 121

A few extra exam problems: **14, 44, 79, 99.** These problems will not be discussed in the seminar, but you will get solutions of them together with the solutions of the other problems.