

Assignment 5 - Due Thursday 2/22/2018

Read: Hubbard and Hubbard Sections 3.7. We will also start on Section 4.1, but I set no homework questions on this section.

Exercises:

Section 3.7: 1, 2, 3*, 4*, 5, 6, 7, 8*, 9, 10, 11, 13*.

Extra question: A* Let $f(x, y) = x^2 + e^y - y$ be defined only on the unit disc $x^2 + y^2 \leq 1$. Show that on the unit disc this function takes its maximum value on the boundary. Calculate the maximum value and a point at which it takes it.

Hint: The equation $e^y - 2y - 1 = 0$ has two roots, the larger of which is greater than 1. At the end of this question use a calculator.

Comments:

Section 3.7 is about Lagrange multipliers, which are a neat idea. My own view is that they might not be that helpful in practice because the calculations you can get into can be very bad. This makes it hard to set complicated questions about Lagrange multipliers on exams, because it would not be possible to do them in limited time. Maybe that is not such a bad thing? If we are only doing the simpler kind of question, then it might make sense to look at a simpler treatment than the one given in Hubbard and Hubbard, which is rather lengthy, and not the main thing this course is about. As it is, you are seeing Lagrange multipliers where there may be more than one multiplier, and this is possibly the only course in this university where this is done.

At the end of Section 3.7 they prove the 'spectral theorem' using Lagrange multipliers, which is not the standard proof. I personally prefer the standard proof, but still this one is not so bad, so we will study it.

We will miss out sections 3.8 and 3.9. The material is good to know about, but nothing subsequently in the book depends on it.