Homework 1

NUMA12: Numerical Approximation

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The purpose of this first homework is to work with the course's basic theoretical concepts, e.g. norms.

You are to work in groups of two.

Hand in electronically a report latest on 08 February 2012 via the link on the course's webpage. Be prepared to present your results and your code in a short oral presentation to one of the course's teachers.

The assignment has 5 tasks. All of them are based on the course book. In case that you don't have the book yet, you are welcome to come to one of the teachers to make copies of the relevant pages.

Task 1

Construct figures similar to Fig. 1.4 in the course book (or on Slide 1.8) but in this case for the 1- and $\infty-$ norm.

Task 2

Solve Task 1.3 in the book

Task 3

Solve Task 1.7 in the book.

Task 4

Solve Task 1.8 in the book.

Task 5

Section 2.4 concludes with a couple of counterexamples, demonstrating that the max norm and the 1-norm have not strictly convex unit circles in $C[a, b]$ and $\mathbb{R}^n$. Work these examples out and be prepared to explain them.

Lycka till!