

NUMERICAL LINEAR ALGEBRA, 2007

HOMEWORK ASSIGNMENT 2

Well performed this homework assignment gives 1 credit point

To be handed in by September 24 at the latest

Exercise 2 a. Solve the question Q2.3 in the text book. (0.5 point)

Exercise 2 b. Solve the question Q2.18 in the text book. (0.5 point)

COMPUTER EXERCISE 2

To be handed in by September 24 at the latest

a) Consider Algorithm 2.3 in the text book for solving a system of linear equations by Gaussian elimination without pivoting. Consider the LU factorization step **as well as** the backward substitution step.

Interchange the two last loops on j and k and check, by implementing in MATLAB, that you get the same solution.

b) Implement the Algorithm 2.4 in MATLAB and add a similar implementation of the back-substitution. Verify that the cpu-time for solving a linear system with this algorithm roughly is $O(n^3)$ for an $n \times n$ system. Use the MATLAB command `cputime` and for instance $n = 200, 400, 800, 1600$.

c) Compare your implementation in b) with MATLAB:s backslash (`\`). Examine the difference in efficiency between the two algorithms for solving $n \times n$ systems. Take as large n as your computer masters.