

FYS4150 - COMPUTATIONAL PHYSICS

PROJECT 1

SVC

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Sammendrag

Exercise a)

Exercise b)

Exercise c)

In this part of the project we did an analysis of the relative error between our own numerical solution and the exact solution. We calculated the error as described in the exercise text,

$$\epsilon_i \log_{10} \left(\left| \frac{v_i - u_i}{u_i} \right| \right)$$

n	ϵ_{max}
10	-1.1797
10^2	-3.0880
10^3	-5.0800
10^4	-7.0753
10^5	-8.3667

Tabell 1: Maximum error for different n when using LU-decomposition with forward and backward substitution. At $n = 10^6$ our program crashes. Also note that the error is decreasing with increasing n .

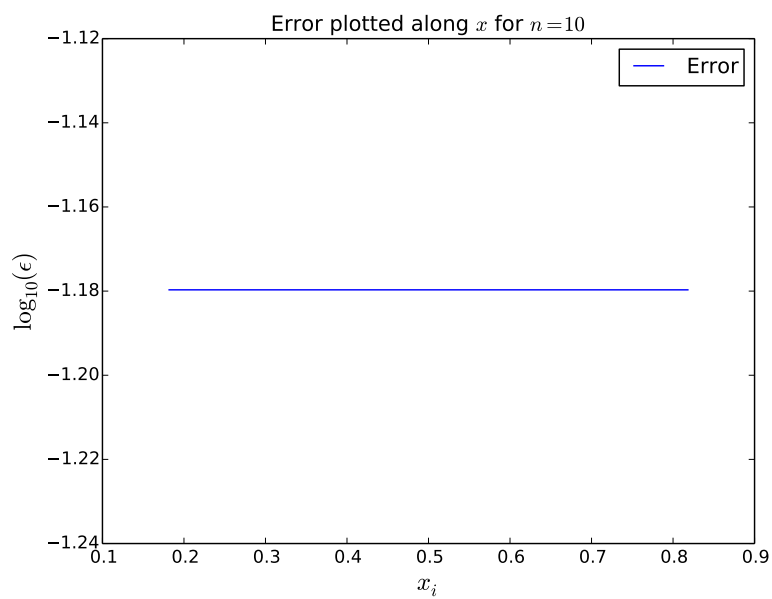


Figure 1: Error plot for $n = 10$

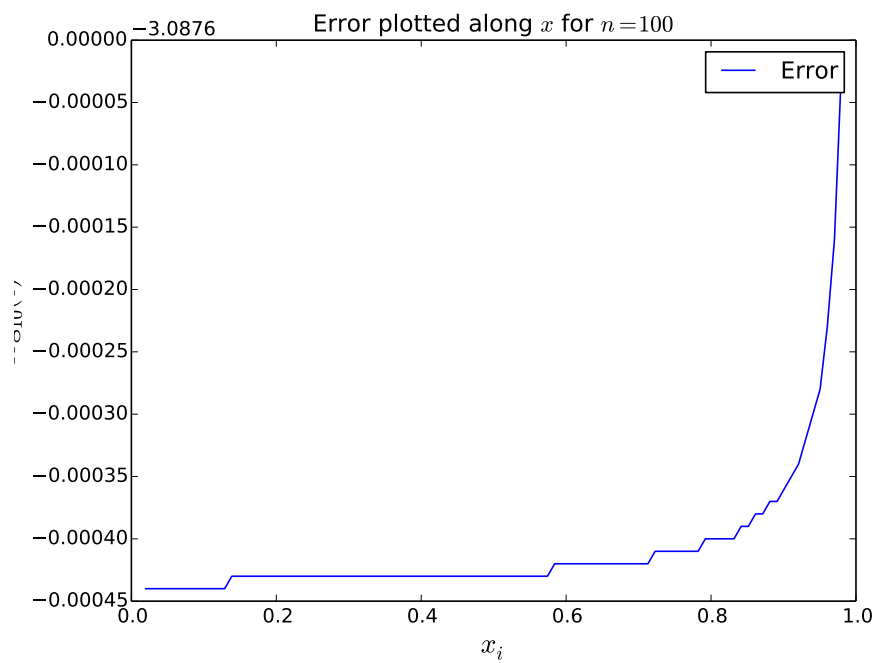


Figure 2: Error plot for $n = 10^2$

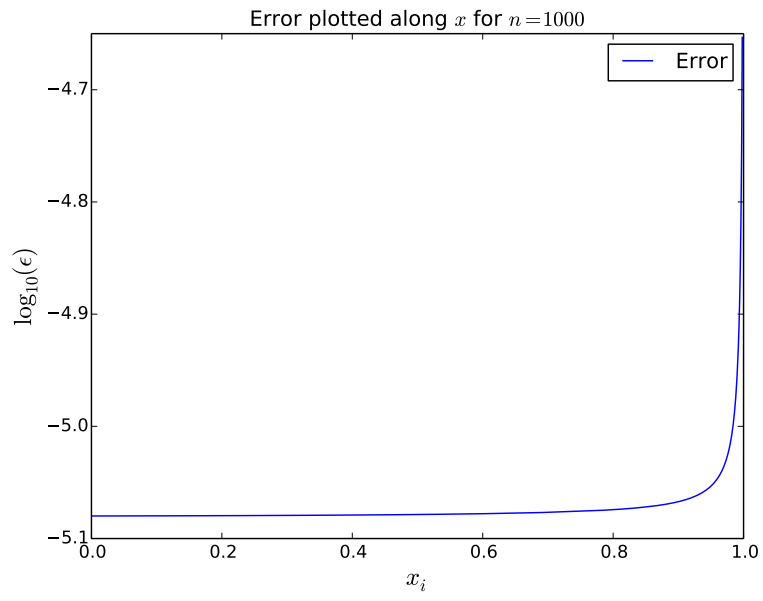


Figure 3: Error plot for $n = 10^3$

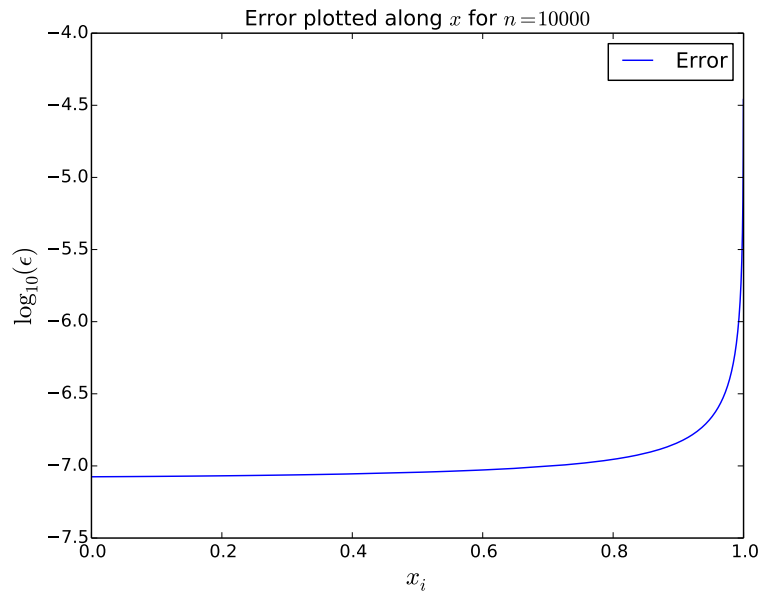


Figure 4: Error plot for $n = 10^4$

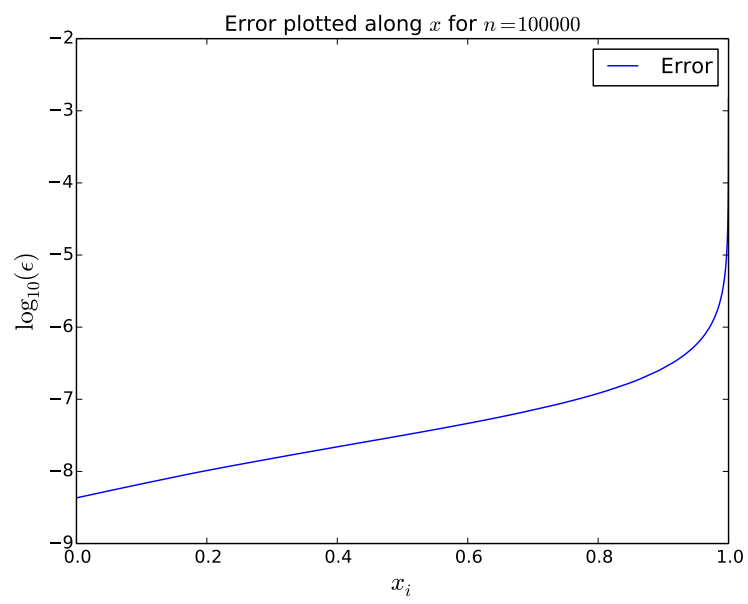


Figure 5: Error plot for $n = 10^5$

Exercise d)