

Serie 7

Exercise 1 We come back to the block Thomas algorithm of Serie 4. The code is in the files *tridi_bl.h*, *tridi_bl.c*, *main.c* and the executable is obtained with the help of the *Makefile*.

1. Test the code with $N = 5$.
2. Measure the CPU time for $N=NMAX$.
3. Identify in the algorithm the basic linear algebra operations and replace them by functions of the Blas library. Modify the code for using these operations.
4. Test the code on the problem with $N = 5$.
5. Compare (CPU time) the new code with the result of point 2. Modify the Makefile for compiling with the Intel compiler (option `-O3 march=core2`) and use the libraries Blas and Lapack of the Mkl library; compare again the CPU time. Since we are using dynamic linking, we must initialize the environment `LD_LIBRARY_PATH` with the directory containing the Mkl libraries before running the program. Furthermore, for running on only one processor, set the environment variable `OMP_NUM_THREADS` to 1.

Exercise 2

1. Write a C program calling the Lapack driver for solving a linear system with a dense matrix of order n , the entries of which are random double precision numbers (function `drand48()`), **with condition number and backward and forward errors estimates**. The right-hand-side has all its components equal to 1.
2. Print the condition number and the errors for $n = 100$; comment the results.