

Numerical Methods for Data Science – Exercise Sheet 4

Exercise 10:

Work out the convergence proof of the FMG algorithm in Section 6.9.2 of J. W. Demmel's book. Especially consider the equations (6.58) and (6.60). You don't need to prove theorem 6.11.

Exercise 11:

Implement the FMG algorithm to solve the two-dimensional Poisson problem with Dirichlet boundary conditions. As a template, you can use the Matlab code of J. Demmel under this link:

https://people.eecs.berkeley.edu/~wkahan/ma221/Matlab/MG_README.html

If you have problems implementing the two-dimensional code, you can write a code to apply the FMG algorithm to the one-dimensional Poisson problem with Dirichlet boundary conditions instead.

We will have a brief look at the Matlab code in the exercise course tomorrow together so you get an idea of the code structure.

**Submit until June 4th 2020, 2:00 pm in the ILIAS.
Review in the exercise course on June 5th 2020.**