Universität Konstanz
Fachbereich Mathematik und Statistik
Jun.-Prof. Dr. Gabriele Ciaramella
Christian Jäkle

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Iterative Methods

Project 2 - All-In-Once approach

Stationary

- Derive the optimality system
- Implement a function `FD_Laplacian` which creates the Finite Difference matrix representation of the Laplace operator (in sparse).
- Implement the collective smoothing.
- Show what kind of stationary method this is.
- Try to get the worst eigenmodes with collecting smoothing.

Krylov

- Implement Anderson acceleration (without restart).
- Apply Anderson on collective smoothing.
- Study the convergence behavior of Anderson.
- Study and analyze the relation between Anderson and GMRES.
- Test precondition GMRES with collecting smoothing as preconditioner and compare it with Anderson and collecting smoothing.

Multigrid

- Solve the all-at-once optimality system using the Multigrid method and the collecting smoothing as a smoother.

Write a short Report about your findings.