

Tasksheet 9:

Task 1. The Inverse Power Method

Write a code that implements the inverse power method for finding the smallest eigenvalue of a square matrix. Use the Jacobi Iteration routine from the previous task to compute the solution of the matrix equation in the algorithm.

Task 2. Shifted Inverse Power Method

Implement the shifted inverse power method for finding eigenvalues of matrices. Use the method to compute at least one eigenvalue different from the largest and smallest eigenvalues of a square matrix.

Task 3. Finding More....

Implement a scheme that will compute as many eigenvalues (and eigenvectors) based on (1) finding the largest and smallest eigenvalues of a given square matrix, (2) partition the interval defined by the smallest to the largest eigenvalue, and (3) using the shifted inverse power method to find the closest eigenvalue to the shift parameter value.

Task 4. OpenMP implementation of the Shifted Power method.

Use OpenMP to optimize the code in Task 3.

Task 5. Gauss Seidel Version.

Implement a version of the code in this assignment that uses Gauss-Seidel instead of the Jacobi iteration. What are the problems in using Gauss Seidel in this setting for parallelization.