

A Relaxed Generalized-PSS Preconditioner for a System of Steady Incompressible Navier-Stokes Equations

Xi Yang¹

We propose a relaxed generalized-PSS preconditioner for generalized saddle-point problem with non-Hermitian positive definite leading block originated from solving the steady incompressible Navier-Stokes equations. It is shown that the new preconditioner outperforms the existing variants of the PSS preconditioner in terms of difference matrix to generalized saddle-point matrix, eigenvalue clustering of preconditioned matrix and computation complexity in each preconditioning step. The optimal-likelihood parameters selection strategy brings the new preconditioner into practical applications. Numerical examples illustrate the effectiveness and robustness of the new preconditioner.

¹Nanjing University of Aeronautics and Astronautics, China (yangxi@nuaa.edu.cn)