Texas Tech University. Applied Mathematics Seminar.

Block Preconditioning for Incompressible Fluid Flow Problems

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ABSTRACT. A significant bottleneck in implicit numerical solution of the incompressible Navier-Stokes equations is the solution of the linear subproblem. Realistic simulations are large enough that iterative solvers must be used, so in turn, an effective preconditioning strategy is required. In this talk, I will introduce block preconditioning methods originally proposed by Kay, Loghin, and Wathen and by Silvester, Elman, Kay, and Wathen. Although effective in certain contexts, these preconditioners have drawbacks that must be addressed for them to be of more practical use, and I will also discuss some of our extensions to these methods that have made them applicable to a wider class of problems.