

TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

Wednesday, 16 March 2011, 4:00 p.m.

Fast Iterative Solution of Models of Incompressible Flow

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Abstract.

We discuss efficient algorithms for computing the numerical solution of the incompressible Navier-Stokes equations and related problems. We show that preconditioning algorithms that take advantage of the structure of the linearized equations can be combined with Krylov subspace methods to produce algorithms that are optimal with respect to discretization mesh size, largely insensitive to Reynolds numbers, and easily adapted to handle both steady and evolutionary problems. We also show how boundary conditions influence the development and performance of these methods, and we demonstrate how they can be generalized to handle more complex models that include thermal effects.