MATHEMATICS DEPARTMENT
North Carolina State University

DIFFERENTIAL EQUATIONS SEMINAR

Wednesday, November 15, 2006
3:00 p.m. 330 Harrelson Hall

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"Pressure estimate for the incompressible Navier-Stokes equation in a bounded domain"

Using a new, sharp estimate for the commutator of the Laplacian and Helmholtz projection operators, we show that the pressure gradient is bounded in the L^2 norm by the viscosity term times a constant less than one, up to lower-order terms. In consequence, NSE can be regarded as a perturbed diffusion equation, rather than as a perturbed Stokes system. This leads to stability results for discretization schemes that (a) provide simple proofs of existence and uniqueness of local strong solutions, and (b) help explain the success of recently developed numerical methods that are fast, accurate near boundaries, and simple and flexible in structure.

This is joint work with Bob Pego (CMU) and Jie Liu (Maryland).

Graduate students are invited to attend.

For questions, comments, and offers to talk, contact Steve Schecter, schecter@math.ncsu.edu. Please visit the DE Seminar web page at www.math.ncsu.edu/seminars.html.