FRG Harmonic Analysis Seminar

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Optimal estimates for the stationary Stokes system in Lipschitz domains (Part 1 of 2)

Abstract: This is the first of two talks concerning the solvability of the stationary Stokes system $\Delta u - \nabla p = 0$, $\text{div } u = 0$ with either Dirichlet or Neumann boundary conditions. The emphasis will be on establishing the well-posedness of the problem for Lipschitz domains in $\mathbb{R}^3$ when the data is taken from either Lebesgue or Hardy spaces. In this first session, I will briefly discuss the background of the problem, including the $L^2$ theory of Fabes, Kenig, and Verchota, and also outline the strategy for dealing with data from the Hardy space $H_p$ with $p \leq 1$.

September 19, 2005
110 Mathematical Sciences
4:00 p.m.-4:50 p.m.
Optimal estimates for the stationary Stokes system in Lipschitz domains (Part 2 of 2)

Abstract: This is a continuation of my previous talk about the solvability of the stationary Stokes system \( \Delta u - \text{grad} p = 0, \text{div} u = 0 \) in Lipschitz domains in \( \mathbb{R}^3 \). The emphasis will be on establishing uniqueness and estimates for the Neumann problem with data from Hardy spaces. I will focus on specific techniques used in the proof that are of independent interest, including:

-- nontangential maximal function estimates
-- pressure estimates
-- Boundary Caccioppoli inequalities
-- “Hole-filling” techniques
-- Reverse Holder estimates
-- Korn’s inequality
-- alternate Neumann boundary conditions

This presentation will be self contained and does not require having attended Part 1.

September 26, 2005
110 Mathematical Sciences
4:00 p.m.-4:50 p.m.