

**Public Abstract**

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Graduation Term:SP 2008

Department:Mathematics

Degree:PhD

Title:Boundary Value Problems for the Stokes System in Arbitrary Lipschitz Domains

This work establishes new results for the Stokes system of hydrostatics in rough domains. The goal is to derive sharp results for all of the main boundary value problems associated with the Stokes system in Lipschitz domains of arbitrary topology in all dimensions. The boundary value problems in question include the Dirichlet problem, the Neumann problem, the Regularity problem, the transmission problem, and the Poisson problem with either Dirichlet or Neumann boundary conditions. At the core of our analysis is the transmission problem, which seeks to determine the velocities and pressures of two fluids in the interior and exterior of a domain which satisfy precise prescribed interactions along the boundary.

Our approach uses boundary integral methods to derive optimal results for the transmission problem, which, in turn, leads to optimal results for the remaining boundary value problems.