

Stationary Navier-Stokes equations in multi-connected domains

Hideo Kozono (Waseda University)

In multi-connected domains, it is still an open question whether there does exist a solution of the stationary Navier-Stokes equations with the inhomogeneous boundary data whose total flux is zero. The relation between the nonlinear structure of the equations and the topological invariance of the domain plays an important role for the solvability of this problem. We prove that if the harmonic part of solenoidal extensions of the given boundary data associated with the second Betti number of the domain is orthogonal to non-trivial solutions of the Euler equations, then there exists a solution for any viscosity constant. The relation between Leary's inequality and the topological type of the domain is also clarified.

This talk is based on the joint work with Prof. Taku Yanagisawa at Nara Women University.