

Nonlinear Problems in Mathematical Physics and Related Topics II

In Honour of Professor O.A. Ladyzhenskaya

edited by

Michael Sh. Birman

St. Petersburg State University, Russia

Stefan Hildebrandt

University of Bonn, Germany

Vsevolod A. Solonnikov

*St. Petersburg POMI,
Russian Academy of Sciences, Russia*

Nina N. Uraltseva

St. Petersburg State University, Russia

New book series, *International Mathematical Series* founded by Kluwer / Plenum Publishers and the Russian publisher, Tamara Rozhkovskaya, published simultaneously in English and in Russian and starts with two volumes dedicated to the famous Russian mathematician Professor **Olga Aleksandrovna Ladyzhenskaya**, on the occasion of her 80th birthday.

The themes covered by *Nonlinear Problems in Mathematical Physics and Related Topics II* reflect the fields of mathematics in which **Professor O.A. Ladyzhenskaya** obtained her most influential results.

One of the main topics considered in the volume is the Navier-Stokes equations. This subject is investigated in many different directions. In particular, the existence and uniqueness results are obtained for the Navier-Stokes equations in spaces of low regularity. A sufficient condition for the regularity of solutions to the evolution Navier-Stokes equations in the three-dimensional case is derived and the stabilization of a solution to the Navier-Stokes equations to the steady-state solution and the realization of stabilization by a feedback boundary control are discussed in detail. Connections between the regularity problem for the Navier-Stokes equations and a backward uniqueness problem for the heat operator are also clarified.

Among many other subjects, generalizations and modified Navier-Stokes equations modeling various physical phenomena, such as the mixture of fluids and isotropic turbulence, are also considered. Numerical results for the Navier-Stokes equations, as well as for the porous medium equation and the heat equation, obtained by the diffusion velocity method are illustrated by computer graphs.

O.A. Ladyzhenskaya graduated from the Moscow State University, but throughout her career she has been closely connected with St. Petersburg where she works at the V.A. Steklov Mathematical Institute of the Russian Academy of Sciences. Many generations of mathematicians have become familiar with the nonlinear theory of partial differential equations reading the books on quasilinear elliptic and parabolic equations written by O.A. Ladyzhenskaya with V.A. Solonnikov and N.N. Uraltseva.

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