Nonlinear Problems in Mathematical Physics and Related Topics I: In Honor of Professor O. A. Ladyzhenskaya (International Mathematical Series)

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The new series, *International Mathematical Series* founded by Kluwer / Plenum Publishers and the Russian publisher, Tamara Rozhkovskaya is 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.

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.

Her results and methods on the Navier-Stokes equations, and other mathematical problems in the theory of viscous fluids, nonlinear partial differential equations and systems, the regularity theory, some directions of computational analysis are well known. So it is no surprise that these two volumes attracted leading specialists in partial differential equations and mathematical physics from more than 15 countries, who present their new results in the various fields of mathematics in which the results, methods, and ideas of O.A. Ladyzhenskaya played a fundamental role.

Nonlinear Problems in Mathematical Physics and Related Topics *I* presents new results from distinguished specialists in the theory of partial differential equations and analysis. A large part of the material is devoted to the Navier-Stokes equations, which play an important role in the theory of viscous fluids. In particular, the existence of a local strong solution (in the sense of Ladyzhenskaya) to the problem describing some special motion in a Navier-Stokes fluid is established. Ladyzhenskaya's results on axially symmetric solutions to the Navier-Stokes fluid are generalized and solutions with fast decay of nonstationary Navier-Stokes equations in the half-space are stated. Application of the Fourier-analysis to the study of the Stokes wave problem and some interesting properties of the Stokes problem are presented. The nonstationary Stokes problem is also investigated in nonconvex domains and some L_p-estimates for the first-order derivatives of solutions are obtained. New results in the theory of fully nonlinear equations are presented. Some asymptotics are derived for elliptic operators with strongly degenerated symbols. New results are also presented for variational problems connected with phase transitions of means in controllable dynamical systems, nonlocal problems for quasilinear parabolic equations, elliptic variational problems with nonstandard growth, and some sufficient conditions for the regularity of lateral boundary.

Additionally, new results are presented on area formulas, estimates for eigenvalues in the case of the weighted Laplacian on Metric graph, application of the direct Lyapunov method in continuum mechanics, singular perturbation property of capillary surfaces, partially free boundary problem for parametric double integrals.

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