Foreword

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Biographical notes: Alexander G. Ramm is an author of more than 590 papers, 2 patents, 12 monographs and an Editor of 3 books. He is an Associate Editor of several journals. He gave more than 140 addresses at various conferences, visited many universities in Europe, Asia, Australia and USA. He won Khwarizmi International Award in Mathematics, was a London Mathematical Society Speaker, distinguished HKSTAM Speaker, CNRS Research Professor, Fulbright Professor in Israel, Mercator Professor in Germany, and distinguished Foreign Professor in Mexico and Egypt. His research interests include many areas of analysis, numerical analysis and mathematical physics.

The special issue of IJCSM Vol. 3, Nos. 1–2, 2010 on ill-posed and inverse problems deals with a variety of problems.

The paper by N.S. Hoang and A.G. Ramm, 'DSM of Newton type for solving operator equations $F(u) = f$ with minimal smoothness assumptions on F', deals with the Dynamical Systems Method (DSM) for solving operator equations. Earlier the usual assumption on the operator F was the existence of the second Fréchet derivative of the nonlinear operator F (Ramm, 2007a). This assumption is replaced in the above paper by the minimal smoothness assumption on F, namely, the existence of a continuous first Fréchet derivative $F'(u)$. This smoothness assumption is obviously minimal, for example, in the DSM analogue of the Newton-type method:

$$\dot{u} = -[F'(u)]^{-1} F(u), \quad u(0) = u_0.$$

In other versions of the DSM even less smooth operators F can be considered. An example is found in the paper by N.S. Hoang, 'Dynamical Systems Method for solving nonlinear equations with locally Hölder continuous monotone operators'.

The paper by Sapto W. Indratno and A.G. Ramm, 'Creating materials with a desired refraction coefficient: numerical experiments', and the paper by M.I. Andriychuk and A.G. Ramm, 'Scattering by many small particles and creating materials with a desired refraction coefficient', numerical results are given for solving many-body wave scattering problem in the case of many small scatterers. An asymptotically exact solution of the many-body scattering problem was recently proposed in Ramm (2007b, 2008), and applied to creating materials with a desired refraction coefficient in Ramm (2009).

The paper by B.T. Johansson, 'Determining the temperature from Cauchy data in corner domains', deals with solving inverse problem for a heat equation in a certain class of non-smooth domains. Boundary value problems in such domains were studied in

the literature extensively, see Kozlov et al. (1997), Nazarov and Plamenevskiĭ (1994), Gol'dshtein and Ramm (2005).

The paper by M. Horvath, 'Inequalities between the fixed-energy phase shifts', deals with spherically symmetric fixed-energy inverse scattering problem. For potentials satisfying certain assumptions the author gives various estimates for phase shifts. Such estimates are of interest both from the theoretical point of view and in applications.

The paper by F. Cakoni and A. Kirsch, 'On the interior transmission eigenvalue problem', deals with scattering of waves in anisotropic media (see also Kirsch and Grinberg (2008)).

The paper by E.L. Korotyaev and A.A. Kutsenko, 'Zigzag nanoribbons in external electric and magnetic fields', deals with the spectrum of Schrödinger operators on zigzag nanoribbons (see Harris (1999) about nanotubes).

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