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PREFACE: SPECIAL ISSUE ON ANALYSIS AND PDE, PART I

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AND ALEXANDER J. ZASLAVSKI

This special issue on Analysis and PDE is dedicated to Professor Shmuel Agmon.

Professor Shmuel Agmon is an outstanding Israeli mathematician who made fundamental contributions to analysis and partial differential equations. These contributions include highlights such as the general theory of elliptic boundary value problems (in collaboration with L. Nirenberg and A. Douglis), Agmon's method for proving exponential decay of eigenfunctions for elliptic operators, and spectral and scattering theory of Schrödinger operators. Shmuel Agmon was born in Tel Aviv in pre-Israel Palestine on February 2, 1922. He began his studies in mathematics at the Hebrew University of Jerusalem in 1940, but enlisted in the Jewish Brigade of the British Army before graduating. After a service of four years in Cyprus, Italy and Belgium he returned to the Hebrew University and completed his studies. He pursued his studies at Paris-Sorbonne University, where he received his Ph.D. degree in 1949 under the supervision of Szolem Mandelbrojt. After working as a visiting scholar at Rice University from 1950 to 1952, he returned to the Hebrew University of Jerusalem, where he became a full professor in 1959.

Shmuel Agmon was awarded the 1991 Israel Prize in mathematics and the 2007 EMET Prize. He also received the Weizmann Prize and the Rothschild Prize. In 2012 he became a fellow of the American Mathematical Society.

Professor Agmon has authored around 70 papers and 4 books, and has supervised the work of 13 PhD candidates.

In this special issue we present papers authored by a selected group of experts in the areas of analysis, PDE and their applications. The papers collected here have been contributed by collaborators, friends, former PhD students and colleagues of Shmuel Agmon, who were influenced by his mathematical work.

The first part of the special issue contains fifteen papers contributed by researchers from Austria, Belgium, Canada, Finland, France, Greece, Israel, Lebanon, Portugal, Russia, Sweden, Switzerland, United Kingdom and the USA. These papers cover a wide spectrum of important problems and topics of current research interest, including nodal solutions for anisotropic (p, q)-equations, periodic boundary conditions for periodic Jacobi matrices on trees, the covariance for parabolic block spin transformations, long-time influence of small perturbations and motion on the simplex of invariant probability measures, Hardy inequalities for discrete magnetic Dirichlet forms, magnetic confinement for the 3D Robin Laplacian, semiclassical Gevrey operators on exponentially weighted spaces of holomorphic functions, Scott and Thomas-Fermi approximations to electronic density, the near-critical behavior of continuous polymers, sharp Agmon-Miranda maximum principles, dispersion relations and spectra of periodically perforated structures, Calderon-Zygmund theory for multi-layer potentials for higher order systems in rough domains, Green functions and Poisson kernels for iterated operators, reverse superposition estimates in

Sobolev spaces, and solvability in the sense of sequences for non Fredholm operators with drift and superdiffusion.

We hope that this special issue will serve as a source of ideas for many mathematicians and mathematical physicists, who are interested in pursuing recent developments in partial differential equations, spectral theory as well as mathematical physics.

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