



PREFACE

A SPECIAL ISSUE ON OPTIMIZATION AND SYSTEM THEORY DEDICATED TO THE MEMORY OF PROFESSOR RAFAIL FEDOROVICH GABASOV

Professor Rafail Fedorovich Gabasov was a Soviet and Belarusian mathematician who made fundamental contributions to optimization, optimal control, and their applications. Rafail Fedorovich Gabasov was born in Magnitogorsk, Russia in 1935. He studied mathematics at the Technical University of Sverdlovsk (now Yekaterinburg), where he received his Ph.D. degree in 1963. His advisors were the outstanding Soviet mathematicians E.A. Barbashin and N. N. Krasovskii. He had Habilitation (Dr. Sc.) in 1968. During 1964-1967 Rafail Fedorovich worked as a senior research fellow at the Ural Branch of the Academy of Sciences of the USSR, and in 1967 he moved to Minsk, Belarus. He served as a university professor at the Belarusian State University during 1967 – 2018.

Professor Rafail Fedorovich Gabasov was one of the founders (together with his life-time collaborator, Prof. F. M. Kirillova) of the Belarusian scientific school of optimization and optimal control. He had around 600 publications, including 18 books some of which were translated into English. Prof. Gabasov supervised around 70 PhD candidates who are now working in many countries around the world. It is difficult to overstate the major contributions to optimization and optimal control made by Prof. Gabasov and his collaborators. Among them we mention developing the theory of singular control and controllability, new approaches to solving problems of linear programming, introducing and developing constructive methods of solutions to complex problems of large-scale optimization, creating powerful algorithms of feedback control in real time, etc. During his mathematical career, Prof. Gabasov received many honors and awards from Belarus, Russia, and other countries. In particular, he was Honored Worker of Science of Belarus, Corresponding Member of the Petrovskaya Academy of Sciences (Russia), etc.

Besides all of this, Professor Rafail Fedorovich Gabasov was a great Teacher, mentor, and friend, a very decent person who will be always remembered by his colleagues, students, collaborators, and everybody who was in touch with him during his life and work.

In this special issue, we present papers authored by a selected group of experts in the areas of optimization and control. The papers collected here have been contributed by collaborators and colleagues of Professor Gabasov, who were highly influenced by his mathematical work.

The special issue contains eleven papers contributed by researchers from Belarus, Georgia, Portugal, and Russia. These papers cover a broad spectrum of important problems and topics of current research interest, including observers for linear time-varying systems with quasiderivative coefficients, stability analysis of mean field type control system with major agent, optimal control strategies with multiple closing instants for linear systems with disturbances, high order tangent vectors to sets with applications to constrained optimization problems, necessary optimality conditions of delay parameters for the nonlinear optimization problem with the mixed initial condition, small parameter method for optimization of singularly perturbed dynamical systems, the synthesis of optimal dynamic systems under condition of uncertainty, linear copositive programming, three-dimensional reachable set for the dubins car, the dynamic reconstruction problem with non-convex geometrical restrictions on the controls, and robust sufficient conditions for the observability of a linear time-invariant singularly perturbed system with delay.

We hope that this special issue will serve as a source of ideas for many mathematicians, who are interested in new developments in optimization, control, and their applications.

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