Obituary

ARIK ARTAVAZDOVICH MELIKYAN
(5 October 1944–6 April 2009)☆

On 6 April 2009, the sudden death was announced, at the age of 65, of Arik Artavazdovich Melikyan, Doctor of Sciences (Physics and Mathematics), professor, Corresponding Member of the Russian Academy of Sciences, winner of the State Prize of the Russian Federation, Foreign Member of the National Academy of Sciences of Armenia, and a prominent scientist in the field of differential games, optimal control, and related areas of the theory of differential equations.

A.A. Melikyan made a significant contribution to differential game theory. His work in this field received worldwide recognition. He introduced the concept of regular differential games in the generalized sense, which enabled the area of application of existing methods for solving differential games to be extended considerably. In differential games it is not sufficient to confine oneself to classical continuous solutions of the Hamilton–Jacobi–Bellman–Isaacs equation; it is also necessary to consider discontinuous solutions and the related singular manifolds on which the discontinuities occur. He proposed and developed the method of singular characteristics, which enables singular manifolds to be constructed using classical methods of the theory of differential equations. This method enables one to construct feedback controls in explicit form in problems of optimal control and differential games and, furthermore, enables conclusions to be drawn concerning the structure and smoothness of viscosity solutions of the Hamilton–Jacobi–Bellman–Isaacs equation. He extended the method to a considerably broader category of first-order partial differential equations. It turned out that the method of singular characteristics can

be used not only to construct optimal strategies in differential games but also to investigate the propagation of weak discontinuities in certain physical media and to process visual information. He made an important contribution to the theory of the control of dynamical systems with incomplete information, and developed game algorithms for optimal search for mobile objects in a confined region using a computer vision system with a restricted aperture. These algorithms can be used in robotics. He was the author of two monographs and over 140 papers that have been published in Russian and international scientific journals.

A.A. Melikyan was born on 5 October 1944 in Yerevan. His parents – Artavazd Mikhailovich and Shushanik Santurovna – were biology teachers. In 1961 he left school with a gold medal and entered the Faculty of Cybernetics of the Yerevan Polytechnic Institute. Having studied there for 2 years, in 1963 he entered the Faculty of Aeromechanics and Applied Mathematics of the Moscow Institute of Physics and Technology (MFTI), from which he graduated with distinction in 1969, having received an engineer/physicist diploma specializing in the dynamics of flight and control. As a postgraduate student at the MFTI, he continued his research on the mathematical theory of control under the scientific guidance of F.L. Chernous'ko, and in 1972 he defended his candidate dissertation on differential games with incomplete information. After his postgraduate course, he worked at the Institute for Problems in Mechanics of the USSR Academy of Sciences (now the A.Yu. Ishlinskii Institute for Problems in Mechanics of the Russian Academy of Sciences), and it is with this establishment that his entire scientific career is associated. Here, he followed the path from junior research fellow to laboratory head. In 1986 he brilliantly defended his doctoral dissertation on game problems of dynamics, in which mathematical methods of classical mechanics and the theory of differential games were combined and mutually enriched. In 1998, he was awarded the State Prize of the Russian Federation in the field of science and technology. In 2003 he was elected a Corresponding Member of the Russian Academy of Sciences.

He carried out a great deal of scientific organizational work, was a member of the Russian National Committee on Theoretical and Applied Mechanics, a member of the Executive Committee of the International Society of Dynamic Games, a member of the editorial board of the journal *Izvestiya Ross. Akad. Nauk. Teoriya i Sistemy Upravleniya*, and a member of the editorial board of the journal *International Game Theory Review*, He also played an active part in the publication of the journal *Prikladnaya Matematika i Mekhanika*, and refereed the manuscripts of papers. He was a member of the programme and organization committees of many Russian and international conferences on the mathematical theory of control and differential games.

He took very seriously his work on the training of the next generation of scientists, was a professor at the MFTI, presented original courses on the variational calculus, optimal control, and differential games, and was a member of the Teaching Method Council of the Faculty of Aerophysics and Space Research. His lectures were deservedly successful in terms of the performance of his students. His students are working successfully at scientific institutes in many countries.

He was not only a prominent scientist and a remarkable teacher but also a fine, sympathetic, exceptionally friendly person endowed with optimism and a sense of humour who knew how to find a way out of difficult situations and helped others to do so. He was an extremely kind man and was multitalented – in his youth, he was an excellent track-and-field athlete, played musical instruments, spoke several foreign languages, in parallel with his main education he studied at the Faculty of Journalism of Moscow State University, took interviews, and wrote stories that were published in the *Literaturnaya Gazeta*.

He will forever be remembered by all who knew him. The staff and editorial board of *Prikladnaya Matematika i Mekhanika* and his students, colleagues, and friends express their sincere condolences to his relatives and those close to him.

Translated by P.S.C.