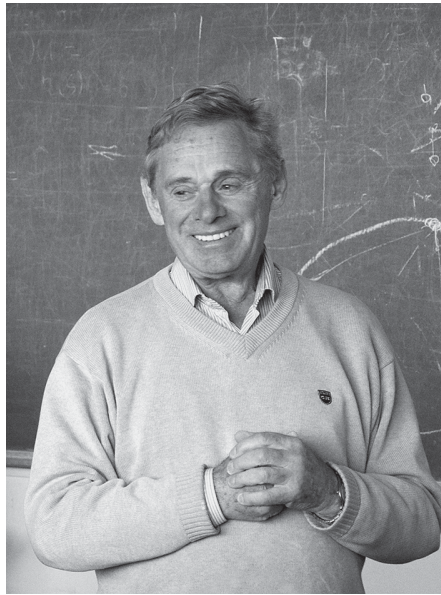

OBITUARY



Boris Theodorovich Polyak
1935–2023

On February 3, 2023, after a serious illness, Boris Theodorovich Polyak, Doctor of technical sciences, a wonderful man, an outstanding scientist, a warm friend to many of us, a wise mentor who educated generations of scientists, passed away at the 88th year.

Boris Theodorovich was born on May 4, 1935, in Moscow, where he lived for all his life. In 1958 he graduated from the Moscow Institute of Steel and Alloys, and in 1963 he completed his postgraduate studies at the Department of Mechanics and Mathematics, Moscow State University (MSU). In 1964 he defended his PhD thesis on methods of gradient descent in abstract functional spaces and later worked at the MSU Computer Center. From 1971 until his last days he was with Laboratory 7 (Ya.Z. Tsyppkin lab) at the Trapeznikov Institute of Control Science, the Russian Academy of Sciences; he headed the laboratory from 1997 to 2013. In 1978 he defended his DSc thesis (higher doctorate, Doctor of Science), where theory and problems of stochastic approximation were analyzed.

Professor Polyak is the author of five monographs (including the famous “Introduction to Optimization”), about 500 articles in journals and proceedings of Russian and international conferences; he was awarded the A.A. Andronov (1994) and B.N. Petrov (2016) prizes of the Russian Academy of Sciences.

It is difficult to overestimate the contribution of Boris Theodorovich to the development of numerical optimization methods, control theory, and stochastic optimization. Generations of researchers in the USSR and Russia, as well as abroad, were brought up on his articles and books. Here are just a few of his results that are sure to leave his name in the history of science: the Tsyppkin–Polyak frequency criterion of robust stability, the Polyak step-size in gradient descent methods for nonsmooth optimization problems, a projection method for finding a common point of sets, the heavy-ball method (which became the forerunner of all modern accelerated/momentum methods of

convex optimization), the Polyak method of conjugate gradients, the Polyak–Lojasiewicz gradient domination condition (one of the most popular relaxations of the strong convexity concept), the Polyak–Tsytkin optimal algorithms of stochastic aggregation, a stochastic approximation method with Polyak–Ruppert–Juditsky averaging... This list could go on for a very, very long time.

Scientific merits and achievements of B.T. Polyak are widely appreciated by international community: he was honorary member of IFAC (2006), worked in the universities of USA, France, Italy, Israel, Mexico, Taiwan, Finland, and other countries; he is a holder of the Gold Medal of the European Association for Operations Research EURO (2012), a recipient of the Khachiyan Prize of the INFORMS Optimization Society (2021).

Boris was not solely an outstanding scientist, he was an excellent organizer and leader: he trained more than 25 candidates and doctors of sciences; for a quarter of a century, he led the weekly seminar on automatic control theory; on his initiative and with direct active participation, the annual all-Russian traditional youth summer schools “Control, Information and Optimization” were held for ten years. For many years he was deputy editor-in-chief of the journal “Automation and Remote Control,” and his contribution to the well-being and successful development of the journal is invaluable.

Boris led a very active life and literally until his last days he participated in various scientific events, always radiating positivity. He never strived for fame, awards, prizes, led a modest but very dignified life, was a kind, but principled man.

Boris Teodorovich had the most remarkable human qualities: a broad soul, responsiveness, sense of humor, optimism, sociability, he was always eager to share scientific ideas with colleagues, to give kind advice. Everyone who was lucky to be acquainted with him can say only good things about him.

Bright memories of Prof. Polyak’s exceptional personality will remain with us forever, and they will give us the optimism that Boris professed throughout his wonderful life.

*M. V. Khlebnikov,
A. V. Nazin,
P. S. Shcherbakov*