

## Volodymyr Vasylyovych Sharko



On 7 October, 2014, at the age of 65, Volodymyr Vasylyovych Sharko passed away. He was an outstanding mathematician, talented teacher, and had a very attractive and charismatic personality inspiring many mathematicians.

V.V. Sharko was born on September 25, 1949 in the town Ottynia of Ivano-Frankivsk region. In 1963 he entered the Faculty of Mechanics and Mathematics of Taras Shevchenko Kyiv University and after graduating in 1973 became a postgraduate student of the Institute of Mathematics of Academy of Sciences of USSR. His scientific adviser was Yu. Yu. Trokhimchuk. From that time the Institute was an inseparable part of Volodymyr Vasylyovich' life.

Primary mathematical interests of V. V. Sharko were connected with Morse theory which links topology, differential geometry, dynamical systems, algebra, mathematical physics and other branches of mathematics. His early results describe path components of spaces of exact Morse functions on high-dimensional manifolds. V.V. Sharko also developed K-theory approach for study minimal Morse functions on non-simply connected manifolds. On one hand, this extended S. Smale's theorems on existence of minimal

Morse functions on simply connected manifolds, and on the other hand exposed deeper interrelations between the structure of Morse and Bott functions on a manifold with its homological invariants.

Volodymyr Vasylyovych defended his Candidate Dissertation “On exact Morse functions” in 1976 and the Doctor of Science Dissertation “Minimal Morse functions” in 1988.

Further, in connection with progress in Hamiltonian dynamics of low dimensions, V.V. Sharko obtained many results concerning topological classification of Morse-Smale flows and Morse functions on surfaces.

In 2001, V.V. Sharko became the head of a newly created topology department. >From that time he started to develop  $L^2$ -theory and its applications to Morse theory and dynamical systems and made a significant contribution into these theories. Recall that Morse inequalities claims that the number of critical points of index  $\lambda$  of a Morse function on a compact manifold is bounded below by the corresponding  $\lambda$ -th Betti number. V.V. Sharko introduced certain  $L^2$ -invariants of a manifold that adjust Betti numbers and change Morse inequalities into equalities. These results are well known over the world.

For his significant scientific achievements V.V.Sharko was awarded by Mykola Ostrovskiy Prize (1980), Krylov Prize and Lavrentyev Prizes of National Academy of Sciences of Ukraine (2005 and 2010 respectively), and State prize of Ukraine in science and technology (2006).

Volodymyr Vasylyovych wrote nearly 100 mathematical papers and 2 books, 20 of his students defended Candidate theses and 3 of them also defended Doctor of Science dissertations. From 1987 he was also a professor in Taras Shevchenko Kyiv National University.

In 2006 V.V. Sharko was elected a Corresponding Member of National Academy of Sciences of Ukraine, and in 2008 become a Deputy director in charge of scientific work of the Institute of mathematics.

Volodymyr Vasylyovych was very active and enthusiastic, and made a lot of efforts for maintaining mathematics in Ukraine. He was a Deputy of Academician-Secretary of Mathematical Section of the National Academy of Sciences of Ukraine, Deputy Editor-in-Chief of Ukrainian Mathematical Journal, a member of Editorial board of Methods of Functional Analysis, Proceedings of the International Geometry Center, and Mathematical Bulletin of the Shevchenko Scientific Society.

Even at his last day he presided over the defence of two Candidate theses.

The memory of Volodymyr Vasylyovych Sharko will always live with all who knew and loved him.

*Editorial Board*